OM-492 190 603BM

2010–06

Processes

MIG (GMAW) and Pulsed MIG (GMAW-P) Welding

Flux Cored (FCAW) Welding

Stick (SMAW) Welding

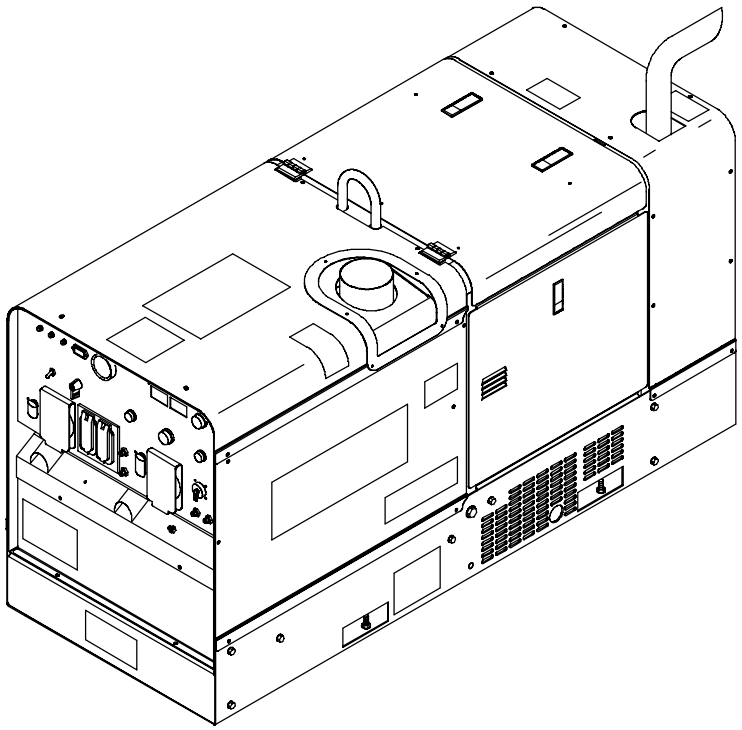
TIG (GTAW) Welding

Air Carbon Arc (CAC-A) Cutting and Gouging

Description

Engine Driven Welding Generator

PipePro® 304



OWNER'S MANUAL

File: Engine-Driven

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www.MillerWelds.com

From Miller to You

Thank you and *congratulations* on choosing Miller. Now you can get the job done and get it done right. We know you don't have time to do it any other way.

That's why when Niels Miller first started building arc welders in 1929, he made sure his products offered long-lasting value and superior quality. Like you, his customers couldn't afford anything less. Miller products had to be more than the best they could be. They had to be the best you could buy.

Today, the people that build and sell Miller products continue the tradition. They're just as committed to providing equipment and service that meets the high standards of quality and value established in 1929.

This Owner's Manual is designed to help you get the most out of your Miller products. Please take time to read the Safety precautions. They will help you protect yourself against potential hazards on the worksite.

ISO 9001 REGISTERED QUALITY SYSTEM

Miller is the first welding equipment manufacturer in the U.S.A. to be registered to the ISO 9001 Quality System Standard.

We've made installation and operation quick and easy. With Miller you can count on years of reliable service with proper maintenance. And if for some reason the unit needs repair, there's a Troubleshooting section that will help you figure out what the problem is. The parts list will then help you to decide the exact part you may need to fix the problem. Warranty and service information for your particular model are also provided.

Miller Electric manufactures a full line of welders and welding related equipment. For information on other quality Miller products, contact your local Miller distributor to receive the latest full line catalog or individual specification sheets. **To locate your nearest distributor or service agency call 1-800-4-A-Miller, or visit us at www.MillerWelds.com on the web.**

TRUE BLUE® WARRANTY

Working as hard as you do – every power source from Miller is backed by the most hassle-free warranty in the business.

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SECTION 1 – SAFETY PRECAUTIONS – READ BEFORE USING

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Protect yourself and others from injury — read, follow, and save these important safety precautions and operating instructions.

1-1. Symbol Usage

DANGER! – Indicates a hazardous situation which, if not avoided, will result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

Indicates a hazardous situation which, if not avoided, could result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

NOTICE *– Indicates statements not related to personal injury.*

☞ *Indicates special instructions.*

This group of symbols means Warning! Watch Out! ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

1-2. Arc Welding Hazards

The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-8. Read and follow all Safety Standards.

Only qualified persons should install, operate, maintain, and repair this unit.

During operation, keep everybody, especially children, away.

ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

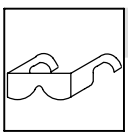
- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Additional safety precautions are required when any of the following electrically hazardous conditions are present: in damp locations or while wearing wet clothing; on metal structures such as floors, gratings, or scaffolds; when in cramped positions such as sitting, kneeling, or lying; or when there is a high risk of unavoidable or accidental contact with the workpiece or ground. For these conditions, use the following equipment in order presented: 1) a semiautomatic DC constant voltage (wire) welder, 2) a DC manual (stick) welder, or 3) an AC welder with reduced open-circuit voltage. In most situations, use of a DC, constant voltage wire welder is recommended. And, do not work alone!
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
- Always verify the supply ground — check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first – double-check connections.
- Keep cords dry, free of oil and grease, and protected from hot metal and sparks.
- Frequently inspect input power cord for damage or bare wiring — replace cord immediately if damaged — bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.
- Do not drape cables over your body.
- If earth grounding of the workpiece is required, ground it directly with a separate cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Do not touch electrode holders connected to two welding machines at the same time since double open-circuit voltage will be present.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal.

SIGNIFICANT DC VOLTAGE exists in inverter power sources AFTER stopping engine.

- Stop engine on inverter and discharge input capacitors according to instructions in Maintenance Section before touching any parts.

HOT PARTS can burn.

- Do not touch hot parts bare handed.
- Allow cooling period before working on equipment.
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.



FLYING METAL or DIRT can injure eyes.

- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.

FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use local forced ventilation at the arc to remove welding fumes and gases.
- If ventilation is poor, wear an approved air-supplied respirator.
- Read and understand the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

BUILDUP OF GAS can injure or kill.

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.

ARC RAYS can burn eyes and skin.

Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

- Wear an approved welding helmet fitted with a proper shade of filter lenses to protect your face and eyes from arc rays and sparks when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash, glare, and sparks; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather, heavy cotton, or wool) and foot protection.

WELDING can cause fire or explosion.

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Do not weld where flying sparks can strike flammable material.
- Protect yourself and others from flying sparks and hot metal.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Do not weld where the atmosphere may contain flammable dust, gas, or liquid vapors (such as gasoline).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock, sparks, and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.
- After completion of work, inspect area to ensure it is free of sparks, glowing embers, and flames.
- Use only correct fuses or circuit breakers. Do not oversize or bypass them.
- Follow requirements in OSHA 1910.252 (a) (2) (iv) and NFPA 51B for hot work and have a fire watcher and extinguisher nearby.

NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.

ELECTRIC AND MAGNETIC FIELDS (EMF) can affect Implanted Medical Devices.

- Wearers of Pacemakers and other Implanted Medical Devices should keep away.
- Implanted Medical Device wearers should consult their doctor and the device manufacturer before going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations.

CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, physical damage, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder — explosion will result.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Use the right equipment, correct procedures, and sufficient number of persons to lift and move cylinders.
- Read and follow instructions on compressed gas cylinders, associated equipment, and Compressed Gas Association (CGA) publication P-1 listed in Safety Standards.

1-3. Engine Hazards

BATTERY EXPLOSION can injure.

- Always wear a face shield, rubber gloves, and protective clothing when working on a battery.
- Stop engine before disconnecting or connecting battery cables, battery charging cables (if applicable), or servicing battery.
- Do not allow tools to cause sparks when working on a battery.
- Do not use welder to charge batteries or jump start vehicles unless the unit has a battery charging feature designed for this purpose.
- Observe correct polarity (+ and –) on batteries.
- Disconnect negative (–) cable first and connect it last.
- Keep sparks, flames, cigarettes, and other ignition sources away from batteries. Batteries produce explosive gases during normal operation and when being charged.
- Follow battery manufacturer's instructions when working on or near a battery.

BATTERY CHARGING OUTPUT can injure.

(Battery charging feature not present on all models.)

- Have only qualified persons do battery charging work.
- Charge lead-acid batteries only. Do not use battery charger to supply power to an extra-low-voltage electrical system or to charge dry cell batteries.
- Do not charge a frozen battery.
- Do not use damaged charging cables.
- Do not charge a battery that has loose terminals or one showing damage such as a cracked case or cover.
- Before charging battery, select correct charger voltage to match battery voltage.
- Set battery charging controls to the Off position before connecting to battery. Do not allow battery charging clips to touch each other.
- Keep charging cables away from vehicle hood, door, or moving parts.

FUEL can cause fire or explosion.

- Stop engine and let it cool off before checking or adding fuel.
- Do not add fuel while smoking or if unit is near any sparks or open flames.
- Do not overfill tank — allow room for fuel to expand.
- Do not spill fuel. If fuel is spilled, clean up before starting engine.
- Dispose of rags in a fireproof container.
- Always keep nozzle in contact with tank when fueling.

MOVING PARTS can injure.

- Keep away from moving parts such as fans, belts, and rotors.
- Keep all doors, panels, covers, and guards closed and securely in place.
- Stop engine before installing or connecting unit.
- Have only qualified persons remove doors, panels, covers, or guards for maintenance and troubleshooting as necessary.
- To prevent accidental starting during servicing, disconnect negative (–) battery cable from battery.
- Keep hands, hair, loose clothing, and tools away from moving parts.
- Reinstall doors, panels, covers, or guards when servicing is finished and before starting engine.
- Before working on generator, remove spark plugs or injectors to keep engine from kicking back or starting.
- Block flywheel so that it will not turn while working on generator components.

EXHAUST SPARKS can cause fire.

- Do not let engine exhaust sparks cause fire.
- Use approved engine exhaust spark arrestor in required areas — see applicable codes.

HOT PARTS can burn.

- Do not touch hot parts bare handed.
- Allow cooling period before working on equipment.
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.

STEAM AND HOT COOLANT can burn.

- If possible, check coolant level when engine is cold to avoid scalding.
- Always check coolant level at overflow tank, if present on unit, instead of radiator (unless told otherwise in maintenance section or engine manual).
- If the engine is warm, checking is needed, and there is no overflow tank, follow the next two statements.
- Wear safety glasses and gloves and put a rag over radiator cap.
- Turn cap slightly and let pressure escape slowly before completely removing cap.

Using a generator indoors CAN KILL YOU IN MINUTES.

- Generator exhaust contains carbon monoxide. This is a poison you cannot see or smell.
- NEVER use inside a home or garage, EVEN IF doors and windows are open.
- Only use OUTSIDE and far away from windows, doors, and vents.

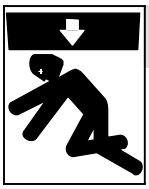
BATTERY ACID can BURN SKIN and EYES.

- Do not tip battery.
- Replace damaged battery.
- Flush eyes and skin immediately with water.

ENGINE HEAT can cause fire.

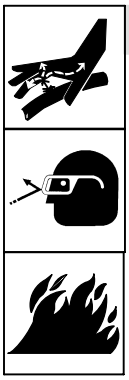
- Do not locate unit on, over, or near combustible surfaces or flammables.
- Keep exhaust and exhaust pipes way from flammables.

1-4. Hydraulic Hazards



HYDRAULIC EQUIPMENT can injure or kill.

- Incorrect installation or operation of this unit could result in equipment failure and personal injury. Only qualified persons should install, operate, and service this unit according to its Owner's Manual, industry standards, and national, state, and local codes.
- Do not exceed the rated output or capacity of the hydraulic pump or any equipment in the hydraulic system. Design hydraulic system so failure of any hydraulic component will not put people or property at risk.
- Before working on hydraulic system, turn off and lockout/tagout unit, release pressure, and be sure hydraulic pressure cannot be accidentally applied.
- Do not work on hydraulic system with unit running unless you are a qualified person and following the manufacturer's instructions.
- Do not modify or alter hydraulic pump or manufacturer-supplied equipment. Do not disconnect, disable, or override any safety equipment in the hydraulic system.
- Use only components/accessories approved by the manufacturer.
- Keep away from potential pinch points or crush points created by equipment connected to the hydraulic system.
- Do not work under or around any equipment that is supported only by hydraulic pressure. Properly support equipment by mechanical means.



HYDRAULIC FLUID can injure or kill.

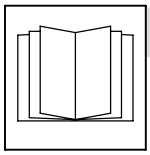
- Before working on hydraulic system, turn off and lockout/tagout unit, release pressure, and be sure hydraulic pressure cannot be accidentally applied.
- Relieve pressure before disconnecting or connecting hydraulic lines.
- Check hydraulic system components and all connections and hoses for damage, leaks, and wear before operating unit.
- Wear protective equipment such as safety glasses, leather gloves, heavy shirt and trousers, high shoes, and a cap when working on hydraulic system.
- Use a piece of paper or cardboard to search for leaks––never use bare hands. Do not use equipment if leaks are found.
- HYDRAULIC FLUID is FLAMMABLE––do not work on hydraulics near sparks or flames; do not smoke near hydraulic fluid.
- Reinstall doors, panels, covers, or guards when servicing is finished and before starting unit.
- If ANY fluid is injected into the skin, it must be surgically removed within a few hours by a doctor familiar with this type of injury or gangrene may result.

MOVING PARTS can injure.

- Keep away from moving parts such as fans, belts and rotors.
- Keep all doors, panels, covers, and guards closed and securely in place.
- Keep hands, hair, loose clothing, and tools away from moving parts.
- Before working on hydraulic system, turn off and lockout/tagout unit, release pressure, and be sure hydraulic pressure cannot be accidentally applied.
- Have only qualified people remove guards or covers for maintenance and troubleshooting as necessary.
- Reinstall doors, panels, covers, or guards when servicing is finished and before starting engine.

HOT PARTS AND FLUID can burn.

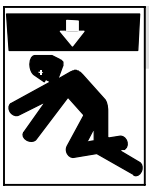
- Do not touch hot parts bare handed or allow hot fluid to contact skin.
- Allow cooling period before working on equipment.
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.



READ INSTRUCTIONS.

- Read and follow all labels and the Owner's Manual carefully before installing, operating, or servicing unit. Read the safety information at the beginning of the manual and in each section.
- Use only genuine replacement parts from the manufacturer.
- Perform maintenance and service according to the Owner's Manuals, industry standards, and national, state, and local codes.

1-5. Compressed Air Hazards

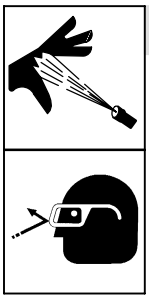


COMPRESSED AIR EQUIPMENT can injure or kill.

- Incorrect installation or operation of this unit could result in equipment failure and personal injury. Only qualified persons should install, operate, and service this unit according to its Owner's Manual, industry standards, and national, state, and local codes.
- Do not exceed the rated output or capacity of the compressor or any equipment in the compressed air system. Design compressed air system so failure of any component will not put people or property at risk.
- Before working on compressed air system, turn off and lockout/tagout unit, release pressure, and be sure air pressure cannot be accidentally applied.
- Do not work on compressed air system with unit running unless you are a qualified person and following the manufacturer's instructions.
- Do not modify or alter compressor or manufacturer-supplied equipment. Do not disconnect, disable, or override any safety equipment in the compressed air system.
- Use only components and accessories approved by the manufacturer.
- Keep away from potential pinch points or crush points created by equipment connected to the compressed air system.
- Do not work under or around any equipment that is supported only by air pressure. Properly support equipment by mechanical means.

HOT METAL from air arc cutting and gouging can cause fire or explosion.

- Do not cut or gouge near flammables.
- Watch for fire; keep extinguisher nearby.



COMPRESSED AIR can injure or kill.

- Before working on compressed air system, turn off and lockout/tagout unit, release pressure, and be sure air pressure cannot be accidentally applied.
- Relieve pressure before disconnecting or connecting air lines.
- Check compressed air system components and all connections and hoses for damage, leaks, and wear before operating unit.
- Do not direct air stream toward self or others.
- Wear protective equipment such as safety glasses, hearing protection, leather gloves, heavy shirt and trousers, high shoes, and a cap when working on compressed air system.
- Use soapy water or an ultrasonic detector to search for leaks–– never use bare hands. Do not use equipment if leaks are found.
- Reinstall doors, panels, covers, or guards when servicing is finished and before starting unit.
- If ANY air is injected into the skin or body seek medical help immediately.

BREATHING COMPRESSED AIR can injure or kill.

- Do not use compressed air for breathing.
- Use only for cutting, gouging, and tools.

TRAPPED AIR PRESSURE AND WHIPPING HOSES can injure.

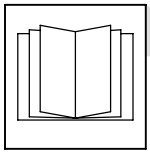
- Release air pressure from tools and system before servicing, adding or changing attachments, or opening compressor oil drain or oil fill cap.

MOVING PARTS can injure.

- Keep away from moving parts such as fans, belts and rotors.
- Keep all doors, panels, covers, and guards closed and securely in place.
- Keep hands, hair, loose clothing, and tools away from moving parts.
- Before working on compressed air system, turn off and lockout/tagout unit, release pressure, and be sure air pressure cannot be accidentally applied.
- Have only qualified people remove guards or covers for maintenance and troubleshooting as necessary.
- Reinstall doors, panels, covers, or guards when servicing is finished and before starting engine.

HOT PARTS can burn.

- Do not touch hot compressor or air system parts.
- Allow cooling period before working on equipment.
- To handle hot parts, use proper tools and/or wear heavy, insulated welding gloves and clothing to prevent burns.



READ INSTRUCTIONS.

- Read and follow all labels and the Owner's Manual carefully before installing, operating, or servicing unit. Read the safety information at the beginning of the manual and in each section.
- Use only genuine replacement parts from the manufacturer.
- Perform maintenance and service according to the Owner's Manuals, industry standards, and national, state, and local codes.

1-6. Additional Symbols For Installation, Operation, And Maintenance

FIRE OR EXPLOSION hazard.

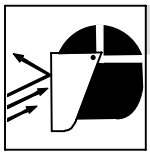
- Do not install or place unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring – be sure power supply system is properly sized, rated, and protected to handle this unit.

FALLING EQUIPMENT can injure.

- Use lifting eye to lift unit and properly installed accessories only, NOT gas cylinders. Do not exceed maximum lift eye weight rating (see Specifications).
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.
- Keep equipment (cables and cords) away from moving vehicles when working from an aerial location.
- Follow the guidelines in the Applications Manual for the Revised NIOSH Lifting Equation (Publication No. 94–110) when manually lifting heavy parts or equipment.

OVERHEATING can damage motors.

- Turn off or unplug equipment before starting or stopping engine.
- Do not let low voltage and frequency caused by low engine speed damage electric motors.
- Do not connect 50 or 60 Hertz motors to the 100 Hertz receptacle where applicable.



FLYING SPARKS can injure.

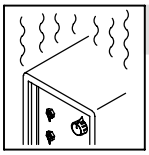
- Wear a face shield to protect eyes and face.
- Shape tungsten electrode only on grinder with proper guards in a safe location wearing proper face, hand, and body protection.
- Sparks can cause fires — keep flammables away.

MOVING PARTS can injure.

- Keep away from moving parts.
- Keep away from pinch points such as drive rolls.

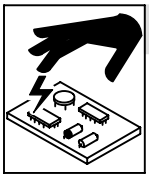
WELDING WIRE can injure.

- Do not press gun trigger until instructed to do so.
- Do not point gun toward any part of the body, other people, or any metal when threading welding wire.



OVERUSE can cause OVERHEATING.

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.

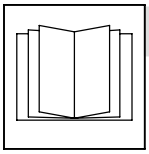


STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.

TILTING OF TRAILER can injure.

- Use tongue jack or blocks to support weight.
- Properly install welding generator onto trailer according to instructions supplied with trailer.



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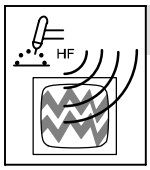

H.F. RADIATION can cause interference.

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.

ARC WELDING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as microprocessors, computers, and computer-driven equipment such as robots.
- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure this welding machine is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

1-7. California Proposition 65 Warnings

Welding or cutting equipment produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)

Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. *Wash hands after handling.*

This product contains chemicals, including lead, known to the state of California to cause cancer, birth defects, or other reproductive harm. *Wash hands after use.*

For Gasoline Engines:

Engine exhaust contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

For Diesel Engines:

Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.

1-8. Principal Safety Standards

Safety in Welding, Cutting, and Allied Processes, ANSI Standard Z49.1, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

Safe Practices for the Preparation of Containers and Piping for Welding and Cutting, American Welding Society Standard AWS F4.1, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Quincy, MA 02269 (phone: 1-800-344-3555, website: www.nfpa.org and www. sparky.org).

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 4221 Walney Road, 5th Floor, Chantilly, VA 20151 (phone: 703-788-2700, website:www.cganet.com).

Safety in Welding, Cutting, and Allied Processes, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 5060 Spectrum Way, Suite 100, Ontario, Canada L4W 5NS (phone: 800-463-6727, website: www.csa-international.org).

Battery Chargers, CSA Standard C22.2 NO 107.2–01, from Canadian Standards Association, Standards Sales, 5060 Spectrum Way, Suite 100, Ontario, Canada L4W 5NS (phone: 800-463-6727, website: www.csa-international.org).

Safe Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 25 West 43rd Street, New York, NY 10036 (phone: 212-642-4900, website: www.ansi.org).

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, NFPA Standard 51B, from National Fire Protection Association, Quincy, MA 02269 (phone: 1-800-344-3555, website: www.nfpa.org.

For Standards about hydraulic systems, contact the National Fluid Power Association, Publications Department, 3333 North Mayfair Road, Suite 211, Milwaukee, WI 53222-3219 (phone: (414) 778-3344, website: www.nfpa.com).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, from U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 (phone: 1-866-512-1800) (there are 10 OSHA Regional Offices—phone for Region 5, Chicago, is 312-353-2220, website: www.osha.gov).

U.S. Consumer Product Safety Commission (CPSC), 4330 East West Highway, Bethesda, MD 20814 (phone: 301-504-7923, website: www.cpsc.gov).

Applications Manual for the Revised NIOSH Lifting Equation, The National Institute for Occupational Safety and Health (NIOSH), 1600 Clifton Rd, Atlanta, GA 30333 (phone: 1-800-232-4636, website: www.cdc.gov/NIOSH).

1-9. EMF Information

Electric current flowing through any conductor causes localized electric and magnetic fields (EMF). Welding current creates an EMF field around the welding circuit and welding equipment. EMF fields may interfere with some medical implants, e.g. pacemakers. Protective measures for persons wearing medical implants have to be taken. For example, access restrictions for passers–by or individual risk assessment for welders. All welders should use the following procedures in order to minimize exposure to EMF fields from the welding circuit:

1. Keep cables close together by twisting or taping them, or using a cable cover.
2. Do not place your body between welding cables. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep head and trunk as far away from the equipment in the welding circuit as possible.
5. Connect work clamp to workpiece as close to the weld as possible.
6. Do not work next to, sit or lean on the welding power source.
7. Do not weld whilst carrying the welding power source or wire feeder.

About Implanted Medical Devices:

Implanted Medical Device wearers should consult their doctor and the device manufacturer before performing or going near arc welding, spot welding, gouging, plasma arc cutting, or induction heating operations. If cleared by your doctor, then following the above procedures is recommended.

SECTION 2 – CONSIGNES DE SÉCURITÉ – LIRE AVANT UTILISATION

Pour écarter les risques de blessure pour vous–même et pour autrui — lire, appliquer et ranger en lieu sûr ces consignes relatives aux précautions de sécurité et au mode opératoire.

2-1. Signification des symboles

DANGER! – Indique une situation dangereuse qui si on l'évite pas peut donner la mort ou des blessures graves. Les dangers possibles sont montrés par les symboles joints ou sont expliqués dans le texte.

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***NOTE** – Indique des déclarations pas en relation avec des blessures personnelles.*

☞ *Indique des instructions spécifiques.*

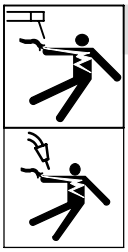
Ce groupe de symboles veut dire Avertissement! Attention! DANGER DE CHOC ELECTRIQUE, PIECES EN MOUVEMENT, et PIECES CHAUDES. Consulter les symboles et les instructions ci-dessous y afférant pour les actions nécessaires afin d'éviter le danger.

2-2. Dangers relatifs au soudage à l'arc

Les symboles présentés ci-après sont utilisés tout au long du présent manuel pour attirer votre attention et identifier les risques de danger. Lorsque vous voyez un symbole, soyez vigilant et suivez les directives mentionnées afin d'éviter tout danger. Les consignes de sécurité présentées ci-après ne font que résumer l'information contenue dans les normes de sécurité énumérées à la section 2-8. Veuillez lire et respecter toutes ces normes de sécurité.

L'installation, l'utilisation, l'entretien et les réparations ne doivent être confiés qu'à des personnes qualifiées.

Au cours de l'utilisation, tenir toute personne à l'écart et plus particulièrement les enfants.



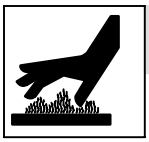
UN CHOC ÉLECTRIQUE peut tuer.

Un simple contact avec des pièces électriques peut provoquer une électrocution ou des blessures graves. L'électrode et le circuit de soudage sont sous tension dès que l'appareil est sur ON. Le circuit d'entrée et les circuits internes de l'appareil sont également sous tension à ce moment-là. En soudage semi-automatique ou automatique, le fil, le dévidoir, le logement des galets d'entraînement et les pièces métalliques en contact avec le fil de soudage sont sous tension. Des matériels mal installés ou mal mis à la terre présentent un danger.

- Ne jamais toucher les pièces électriques sous tension.
- Porter des gants et des vêtements de protection secs ne comportant pas de trous.
- S'isoler de la pièce et de la terre au moyen de tapis ou d'autres moyens isolants suffisamment grands pour empêcher le contact physique éventuel avec la pièce ou la terre.
- Ne pas se servir de source électrique à courant électrique dans les zones humides, dans les endroits confinés ou là où on risque de tomber.
- Se servir d'une source électrique à courant électrique UNIQUEMENT si le procédé de soudage le demande.
- Si l'utilisation d'une source électrique à courant électrique s'avère nécessaire, se servir de la fonction de télécommande si l'appareil en est équipé.
- Des précautions de sécurité supplémentaires sont requises dans des environnements à risque comme: les endroits humides ou lorsque l'on porte des vêtements mouillés; sur des structures métalliques au sol, grillages et échafaudages; dans des positions assises, à genoux et allongées; ou quand il y a un risque important de contact accidentel avec la pièce ou le sol. Dans ces cas utiliser les appareils suivants dans l'ordre de préférence: 1) un poste à souder DC semi–automatique de type CV (MIG/MAG), 2) un poste à souder manuel (électrode enrobée) DC, 3) un poste à souder manuel AC avec tension à vide réduite. Dans la plupart des cas, un poste courant continu de type CV est recommandé. Et, ne pas travailler seul!
- Couper l'alimentation ou arrêter le moteur avant de procéder à l'installation, à la réparation ou à l'entretien de l'appareil. Déverrouiller l'alimentation selon la norme OSHA 29 CFR 1910.147 (voir normes de sécurité).
- Installer et mettre à la terre correctement cet appareil conformément à son manuel d'utilisation et aux codes nationaux, provinciaux et municipaux.
- Toujours vérifier la terre du cordon d'alimentation – Vérifier et s'assurer que le fil de terre du cordon d'alimentation est bien raccordé à la borne de terre du sectionneur ou que la fiche du cordon est raccordée à une prise correctement mise à la terre.
- En effectuant les raccordements d'entrée fixer d'abord le conducteur de mise à la terre approprié et contre-vérifier les connexions.
- Les câbles doivent être exempts d'humidité, d'huile et de graisse; protégez–les contre les étincelles et les pièces métalliques chaudes.
- Vérifier fréquemment le cordon d'alimentation pour voir s'il n'est pas endommagé ou dénudé – remplacer le cordon immédiatement s'il est endommagé – un câble dénudé peut provoquer une électrocution.
- Mettre l'appareil hors tension quand on ne l'utilise pas.
- Ne pas utiliser des câbles usés, endommagés, de grosseur insuffisante ou mal épissés.
- Ne pas enrouler les câbles autour du corps.
- Si la pièce soudée doit être mise à la terre, le faire directement avec un câble distinct – ne pas utiliser le connecteur de pièce ou le câble de retour.
- Ne pas toucher l'électrode quand on est en contact avec la pièce, la terre ou une électrode provenant d'une autre machine.
- Ne pas toucher des porte électrodes connectés à deux machines en même temps à cause de la présence d'une tension à vide doublée.
- N'utiliser qu'un matériel en bon état. Réparer ou remplacer sur-le-champ les pièces endommagées. Entretenir l'appareil conformément à ce manuel.
- Porter un harnais de sécurité quand on travaille en hauteur.
- Maintenir solidement en place tous les panneaux et capots.
- Fixer le câble de retour de façon à obtenir un bon contact métal-métal avec la pièce à souder ou la table de travail, le plus près possible de la soudure.
- Isoler la pince de masse quand pas mis à la pièce pour éviter le contact avec tout objet métallique.

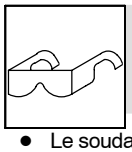
Il reste une TENSION DC NON NÉGLIGEABLE dans les sources de soudage onduleur UNE FOIS le moteur coupé.

- Couper l'alimentation du poste et décharger les condensateurs d'entrée comme indiqué dans la Section Maintenance avant de toucher des composants.



LES PIÈCES CHAUDES peuvent provoquer des brûlures.

- Ne pas toucher à mains nues les parties chaudes.
- Prévoir une période de refroidissement avant de travailler à l'équipement.
- Ne pas toucher aux pièces chaudes, utiliser les outils recommandés et porter des gants de soudage et des vêtements épais pour éviter les brûlures.



DES PIECES DE METAL ou DES SALETES peuvent provoquer des blessures dans les yeux.

- Le soudage, l'écaillement, le passage de la pièce à la brosse en fil de fer, et le meulage génèrent des étincelles et des particules métalliques volantes. Pendant la période de refroidissement des soudures, elles risquent de projeter du laitier.
- Porter des lunettes de sécurité avec écrans latéraux ou un écran facial.

LES FUMÉES ET LES GAZ peuvent être dangereux.

Le soudage génère des fumées et des gaz. Leur inhalation peut être dangereux pour votre santé.

- Eloigner votre tête des fumées. Ne pas respirer les fumées.
- À l'intérieur, ventiler la zone et/ou utiliser une ventilation forcée au niveau de l'arc pour l'évacuation des fumées et des gaz de soudage.
- Si la ventilation est médiocre, porter un respirateur anti-vapeurs approuvé.
- Lire et comprendre les spécifications de sécurité des matériaux (MSDS) et les instructions du fabricant concernant les métaux, les consommables, les revêtements, les nettoyants et les dégraisseurs.
- Travailler dans un espace fermé seulement s'il est bien ventilé ou en portant un respirateur à alimentation d'air. Demander toujours à un surveillant dûment formé de se tenir à proximité. Des fumées et des gaz de soudage peuvent déplacer l'air et abaisser le niveau d'oxygène provoquant des blessures ou des accidents mortels. S'assurer que l'air de respiration ne présente aucun danger.
- Ne pas souder dans des endroits situés à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l'arc peuvent réagir en présence de vapeurs et former des gaz hautement toxiques et irritants.
- Ne pas souder des métaux munis d'un revêtement, tels que l'acier galvanisé, plaqué en plomb ou au cadmium à moins que le revêtement n'ait été enlevé dans la zone de soudure, que l'endroit soit bien ventilé, et en portant un respirateur à alimentation d'air. Les revêtements et tous les métaux renfermant ces éléments peuvent dégager des fumées toxiques en cas de soudage.

LES ACCUMULATIONS DE GAZ risquent de provoquer des blessures ou même la mort.

- Fermer l'alimentation du gaz protecteur en cas de non utilisation.
- Veiller toujours à bien aérer les espaces confinés ou se servir d'un respirateur d'adduction d'air homologué.

LES RAYONS DE L'ARC peuvent provoquer des brûlures dans les yeux et sur la peau.

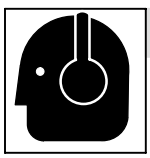
Le rayonnement de l'arc du procédé de soudage génère des rayons visibles et invisibles intenses (ultraviolets et infrarouges) susceptibles de provoquer des brûlures dans les yeux et sur la peau. Des étincelles sont projetées pendant le soudage.

- Porter un casque de soudage approuvé muni de verres filtrants approprié pour protéger visage et yeux pour protéger votre visage et vos yeux pendant le soudage ou pour regarder (voir ANSI Z49.1 et Z87.1 énuméré dans les normes de sécurité).
- Porter des lunettes de sécurité avec écrans latéraux même sous votre casque.
- Avoir recours à des écrans protecteurs ou à des rideaux pour protéger les autres contre les rayonnements les éblouissements et les étincelles ; prévenir toute personne sur les lieux de ne pas regarder l'arc.
- Porter des vêtements confectionnés avec des matières résistantes et ignifuges (cuir, coton lourd ou laine) et des bottes de protection.

LE SOUDAGE peut provoquer un incendie ou une explosion.

Le soudage effectué sur des conteneurs fermés tels que des réservoirs, tambours ou des conduites peut provoquer leur éclatement. Des étincelles peuvent être projetées de l'arc de soudure. La projection d'étincelles, des pièces chaudes et des équipements chauds peut provoquer des incendies et des brûlures. Le contact accidentel de l'électrode avec des objets métalliques peut provoquer des étincelles, une explosion, un surchauffement ou un incendie. Avant de commencer le soudage, vérifier et s'assurer que l'endroit ne présente pas de danger.

- Déplacer toutes les substances inflammables à une distance de 10,7 m de l'arc de soudage. En cas d'impossibilité les recouvrir soigneusement avec des protections homologués.
- Ne pas souder dans un endroit là où des étincelles peuvent tomber sur des substances inflammables.
- Se protéger et d'autres personnes de la projection d'étincelles et de métal chaud.
- Des étincelles et des matériaux chauds du soudage peuvent facilement passer dans d'autres zones en traversant de petites fissures et des ouvertures.
- Surveiller tout déclenchement d'incendie et tenir un extincteur à proximité.
- Le soudage effectué sur un plafond, plancher, paroi ou séparation peut déclencher un incendie de l'autre côté.
- Ne pas effectuer le soudage sur des conteneurs fermés tels que des réservoirs, tambours, ou conduites, à moins qu'ils n'aient été préparés correctement conformément à AWS F4.1 (voir les normes de sécurité).
- Ne soudez pas si l'air ambiant est chargé de particules, gaz, ou vapeurs inflammables (vapeur d'essence, par exemple).
- Brancher le câble de masse sur la pièce le plus près possible de la zone de soudage pour éviter le transport du courant sur une longue distance par des chemins inconnus éventuels en provoquant des risques d'électrocution, d'étincelles et d'incendie.
- Ne pas utiliser le poste de soudage pour dégeler des conduites gelées.
- En cas de non utilisation, enlever la baguette d'électrode du porte-électrode ou couper le fil à la pointe de contact.
- Porter des vêtements de protection dépourvus d'huile tels que des gants en cuir, une chemise en matériau lourd, des pantalons sans revers, des chaussures hautes et un couvre chef.
- Avant de souder, retirer toute substance combustible de vos poches telles qu'un allumeur au butane ou des allumettes.
- Une fois le travail achevé, assurez–vous qu'il ne reste aucune trace d'étincelles incandescentes ni de flammes.
- Utiliser exclusivement des fusibles ou coupe–circuits appropriés. Ne pas augmenter leur puissance; ne pas les ponter.
- Suivre les recommandations dans OSHA 1910.252(a)(2)(iv) et NFPA 51B pour les travaux à chaud et avoir de la surveillance et un extincteur à proximité.



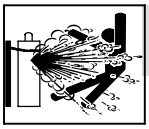
LE BRUIT peut affecter l'ouïe.

Le bruit des processus et des équipements peut affecter l'ouïe.

- Porter des protections approuvés pour les oreilles si le niveau sonore est trop élevé.

Les CHAMPS ÉLECTROMAGNÉTIQUES (CEM) peuvent affecter les implants médicaux.

- Les porteurs de stimulateurs cardiaques et autres implants médicaux doivent rester à distance.
- Les porteurs d'implants médicaux doivent consulter leur médecin et le fabricant du dispositif avant de s'approcher de la zone où se déroule du soudage à l'arc, du soudage par points, du gougeage, de la découpe plasma ou une opération de chauffage par induction.



Si des BOUTEILLES sont endommagées, elles pourront exploser.

Des bouteilles de gaz protecteur contiennent du gaz sous haute pression. Si une bouteille est endommagée, elle peut exploser. Du fait que les bouteilles de gaz font normalement partie du procédé de soudage, les manipuler avec précaution.

- Protéger les bouteilles de gaz comprimé d'une chaleur excessive, des chocs mécaniques, des dommages physiques, du laitier, des flammes ouvertes, des étincelles et des arcs.
- Placer les bouteilles debout en les fixant dans un support stationnaire ou dans un porte-bouteilles pour les empêcher de tomber ou de se renverser.
- Tenir les bouteilles éloignées des circuits de soudage ou autres circuits électriques.
- Ne jamais placer une torche de soudage sur une bouteille à gaz.
- Une électrode de soudage ne doit jamais entrer en contact avec une bouteille.
- Ne jamais souder une bouteille pressurisée – risque d'explosion.
- Utiliser seulement des bouteilles de gaz protecteur, régulateurs, tuyaux et raccords convenables pour cette application spécifique; les maintenir ainsi que les éléments associés en bon état.
- Ne pas tenir la tête en face de la sortie en ouvrant la soupape de la bouteille.
- Maintenir le chapeau de protection sur la soupape, sauf en cas d'utilisation ou de branchement de la bouteille.
- Utiliser les équipements corrects, les bonnes procédures et suffisamment de personnes pour soulever et déplacer les bouteilles.
- Lire et suivre les instructions sur les bouteilles de gaz comprimé, l'équipement connexe et le dépliant P-1 de la CGA (Compressed Gas Association) mentionné dans les principales normes de sécurité.

2-3. Dangers existant en relation avec le moteur

L'EXPLOSION DE LA BATTERIE peut provoquer des blessures.

- Toujours porter une protection faciale, des gants en caoutchouc et vêtements de protection lors d'une intervention sur la batterie.
- Arrêter le moteur avant de débrancher ou de brancher des câbles de batterie, des câbles de chargeur de batterie (le cas échéant) ou de batterie d'entretien.
- Eviter de provoquer des étincelles avec les outils en travaillant sur la batterie.
- Ne pas utiliser l'appareil de soudage pour charger des batteries ou faire démarrer des véhicules à l'aide de câbles de démarrage, sauf si l'appareil dispose d'une fonctionnalité de charge de batterie destinée à cet usage.
- Observer la polarité correcte (+ et –) sur les batteries.
- Débrancher le câble négatif (–) en premier lieu. Le rebrancher en dernier lieu.
- Les sources d'étincelles, flammes nues, cigarettes et autres sources d'inflammation doivent être maintenues à l'écart des batteries. Ces dernières produisent des gaz explosifs en fonctionnement normal et en cours de charge.
- Respecter les consignes du fabricant de la batterie pour travailler sur une batterie ou à proximité.

Le COURANT DE CHARGE DE BATTERIE peut provoquer des blessures (la fonctionnalité de charge de batterie n'est pas disponible sur tous les modèles).

- Les opérations de charge de batterie ne doivent être effectuées que par des personnes qualifiées.
- Ne charger que des batteries plomb–acide. Ne pas utiliser le chargeur de batterie pour alimenter un autre circuit électrique basse tension ou pour charger des batteries sèches.
- Ne pas charger une batterie gelée.
- Ne pas utiliser de câbles de charge endommagés.
- Ne pas charger une batterie dont les bornes sont desserrées ou présentant une détérioration comme par exemple un boîtier ou un couvercle fissuré.
- Avant de charger une batterie, sélectionner la tension de charge correspondant à la tension de la batterie.
- Régler les commandes de charge de batterie sur la position d'arrêt avant de brancher la batterie. Veiller à ce que les pinces de charge ne se touchent pas.
- Ranger les câbles de charge à distance du capot, des portes et des pièces mobiles du véhicule.

LE CARBURANT MOTEUR peut provoquer un incendie ou une explosion.

- Arrêter le moteur avant de vérifier le niveau de carburant ou de faire le plein.
- Ne pas faire le plein en fumant ou proche d'une source d'étincelles ou d'une flamme nue.
- Ne pas faire le plein de carburant à ras bord; prévoir de l'espace pour son expansion.
- Faire attention de ne pas renverser de carburant. Nettoyer tout carburant renversé avant de faire démarrer le moteur.
- Jeter les chiffons dans un récipient ignifuge.
- Toujours garder le pistolet en contact avec le réservoir lors du remplissage.

Les PIÈCES MOBILES peuvent causer des blessures.

- S'abstenir de toucher des parties mobiles telles que des ventilateurs, courroies et rotors.
- Maintenir fermés et verrouillés les portes, panneaux, recouvrements et dispositifs de protection.
- Arrêter le moteur avant d'installer ou brancher l'appareil.
- Lorsque cela est nécessaire pour des travaux d'entretien et de dépannage, faire retirer les portes, panneaux, recouvrements ou dispositifs de protection uniquement par du personnel qualifié.
- Pour empêcher tout démarrage accidentel pendant les travaux d'entretien, débrancher le câble négatif (–) de batterie de la borne.
- Ne pas approcher les mains, cheveux, vêtements lâches et outils des organes mobiles.
- Remettre en place les portes, panneaux, recouvrements ou dispositifs de protection à la fin des travaux d'entretien et avant de mettre le moteur en marche.
- Avant d'intervenir, déposer les bougies ou injecteurs pour éviter la mise en route accidentelle du moteur.
- Bloquer le volant moteur pour éviter sa rotation lors d'une intervention sur le générateur.

LES ÉTINCELLES À L'ÉCHAPPEMENT peuvent provoquer un incendie.

- Empêcher les étincelles d'échappement du moteur de provoquer un incendie.
- Utiliser uniquement un pare-étincelles approuvé – voir codes en vigueur.

LES PIÈCES CHAUDES peuvent provoquer des brûlures.

- Ne pas toucher des parties chaudes à mains nues.
- Prévoir une période de refroidissement avant de travailler à l'équipement.
- Ne pas toucher aux pièces chaudes, utiliser les outils recommandés et porter des gants de soudage et des vêtements épais pour éviter les brûlures.

LA VAPEUR ET LE LIQUIDE DE REFROIDISSEMENT CHAUD peuvent provoquer des brûlures.

- Il est préférable de vérifier le liquide de refroidissement une fois le moteur refroidi pour éviter de se brûler.
- Toujours vérifier le niveau de liquide de refroidissement dans le vase d'expansion (si présent), et non dans le radiateur (sauf si précisé autrement dans la section maintenance du manuel du moteur).
- Si le moteur est chaud et que le liquide doit être vérifié, opérer comme suivant.
- Mettre des lunettes de sécurité et des gants, placer un torchon sur le bouchon du radiateur.
- Dévisser le bouchon légèrement et laisser la vapeur s'échapper avant d'enlever le bouchon.

L'utilisation d'un groupe autonome à l'intérieur PEUT VOUS TUER EN QUELQUES MINUTES.

- Les fumées d'un groupe autonome contient du monoxyde de carbone. C'est un poison invisible et inodore.
- JAMAIS utiliser dans une maison ou garage, même avec les portes et fenêtres ouvertes.
- Uniquement utiliser à l'EXTERIEUR, loin des portes, fenêtres et bouches aération.

L'ACIDE DE LA BATTERIE peut provoquer des brûlures dans les YEUX et sur la PEAU.

- Ne pas renverser la batterie.
- Remplacer une batterie endommagée.
- Rincer immédiatement les yeux et la peau à l'eau.

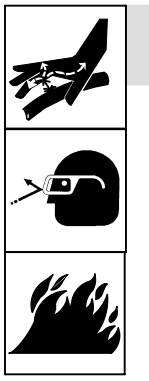
LA CHALEUR DU MOTEUR peut provoquer un incendie.

- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces inflammables.
- Tenir à distance les produits inflammables de l'échappement.

2-4. Dangers liés à l'hydraulique

Les ÉQUIPEMENTS HYDRAULIQUES peuvent provoquer des blessures ou même la mort.

- Une installation ou une utilisation incorrecte de cet appareil pourrait conduire à des dégâts matériels ou corporels. Seul un personnel qualifié est autorisé à installer, faire fonctionner et réparer cet appareil conformément à son manuel d'utilisation, aux normes industrielles et aux codes nationaux, d'état ou locaux.
- Ne pas dépasser le débit nominal ou la capacité de la pompe hydraulique ou de tout équipement du circuit hydraulique. Concevoir le circuit hydraulique de telle sorte que la défaillance d'un composant hydraulique ne risque pas de provoquer un accident matériel ou corporel.
- Avant d'intervenir sur le circuit hydraulique, couper l'alimentation électrique, verrouiller et étiqueter l'appareil, détendre la pression et s'assurer que le circuit hydraulique ne peut être remis sous pression par inadvertance.
- Ne pas intervenir sur le circuit hydraulique lorsque l'appareil fonctionne. Seul un personnel qualifié et appliquant les consignes du fabricant est autorisé le faire.
- Ne pas modifier ou altérer la pompe hydraulique ou les équipements fournis par le fabricant. Ne pas débrancher, désactiver ou neutraliser les équipements de sécurité du circuit hydraulique.
- Utiliser uniquement des composants et accessoires homologués par le fabricant.
- Se tenir à l'écart de tout point présentant un danger de pincement ou d'écrasement créé par l'équipement raccordé au circuit hydraulique.
- Ne pas intervenir sous ou autour d'un équipement qui n'est soutenu que par la pression hydraulique. Soutenir l'équipement de façon appropriée par un moyen mécanique.



Le LIQUIDE HYDRAULIQUE risque de provoquer des blessures ou même la mort.

- Avant d'intervenir sur le circuit hydraulique, couper l'alimentation électrique, verrouiller et étiqueter l'appareil, détendre la pression et s'assurer que le circuit hydraulique ne peut être remis sous pression par inadvertance.
- Détendre la pression avant de débrancher ou de brancher des canalisations hydrauliques.
- Avant d'utiliser l'appareil, contrôler les composants du circuit hydraulique, les branchements et les flexibles en recherchant tout signe de détérioration, de fuite et d'usure.
- Pour intervenir sur un circuit hydraulique, porter un équipement de protection tel que des lunettes de sécurité, des gants de cuir, une chemise et un pantalon en tissu résistant, des chaussures montantes et une coiffe.
- Pour rechercher des fuites, utiliser un morceau de papier ou de carton, jamais les mains nues. En cas de détection de fuite, ne pas utiliser l'équipement.
- Le LIQUIDE HYDRAULIQUE est INFLAMMABLE. Ne pas intervenir sur des composants hydrauliques à proximité d'étincelles ou de flammes; ne pas fumer à proximité de liquide hydraulique.
- Remettre les portes, panneaux, recouvrements ou dispositifs de protection quand l'entretien est terminé et avant de mettre en marche l'appareil.
- En cas de pénétration d'un QUELCONQUE liquide dans la peau, celui–ci doit être retiré chirurgicalement sous quelques heures par

un médecin familiarisé avec ce type de blessure, faute de quoi la gangrène pourrait apparaître.

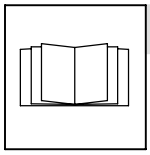
Les PIÈCES MOBILES peuvent causer des blessures.

- S'abstenir de toucher des parties mobiles telles que des ventilateurs, courroies et rotors.
- Maintenir fermés et verrouillés les portes, panneaux, recouvrements et dispositifs de protection.

- Ne pas approcher les mains, cheveux, vêtements lâches et outils des organes mobiles.
- Avant d'intervenir sur le circuit hydraulique, couper l'alimentation électrique, verrouiller et étiqueter l'appareil, détendre la pression et s'assurer que le circuit hydraulique ne peut être remis sous pression par inadvertance.
- Demander seulement à un personnel qualifié d'enlever les dispositifs de sécurité ou les recouvrements pour effectuer, s'il y a lieu, des travaux d'entretien et de dépannage.
- Remettre en place les portes, panneaux, recouvrements ou dispositifs de protection à la fin des travaux d'entretien et avant de mettre le moteur en marche.

LES PIÈCES ET LIQUIDES CHAUDS peuvent provoquer des brûlures.

- Ne pas toucher les pièces chaudes à main nue ni laisser des liquides chauds entrer en contact avec la peau.
- Prévoir une période de refroidissement avant d'intervenir sur l'équipement.
- Ne pas toucher aux pièces chaudes, utiliser les outils recommandés et porter des gants de soudage et des vêtements épais pour éviter les brûlures.



LIRE LES INSTRUCTIONS.

- Lire et appliquer les instructions sur les étiquettes et le Mode d'emploi avant l'installation, l'utilisation ou l'entretien de l'appareil. Lire les informations de sécurité au début du manuel et dans chaque section.
- N'utiliser que les pièces de rechange recommandées par le constructeur.
- Effectuer l'entretien en respectant les manuels d'utilisation, les normes industrielles et les codes nationaux, d'état et locaux.

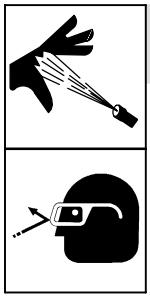
2-5. Dangers liés à l'air comprimé

Un ÉQUIPEMENT PNEUMATIQUE risque de provoquer des blessures ou même la mort.

- Une installation ou une utilisation incorrecte de cet appareil pourrait conduire à des dégâts matériels ou corporels. Seul un personnel qualifié est autorisé à installer, utiliser et entretenir cet appareil conformément à son manuel d'utilisation, aux normes industrielles et aux codes nationaux, d'état ou locaux.
- Ne pas dépasser le débit nominal ou la capacité du compresseur ou de tout équipement du circuit d'air comprimé. Concevoir le circuit d'air comprimé de telle sorte que la défaillance d'un composant ne risque pas de provoquer un accident matériel ou corporel.
- Avant d'intervenir sur le circuit d'air comprimé, couper l'alimentation électrique, verrouiller et étiqueter l'appareil, détendre la pression et s'assurer que le circuit d'air ne peut être mis sous pression par inadvertance.
- Ne pas intervenir sur le circuit d'air comprimé lorsque l'appareil fonctionne. Seul un personnel qualifié est autorisé, et appliquant les consignes du fabricant.
- Ne pas modifier ou altérer le compresseur ou les équipements fournis par le fabricant. Ne pas débrancher, désactiver ou neutraliser les équipements de sécurité du circuit d'air comprimé.
- Utiliser uniquement des composants et accessoires homologués par le fabricant.
- Se tenir à l'écart de tout point présentant un danger de pincement ou d'écrasement créé par l'équipement raccordé au circuit d'air comprimé.
- Ne pas intervenir sous ou autour d'un équipement qui n'est soutenu que par la pression pneumatique. Soutenir l'équipement de façon appropriée par un moyen mécanique.

MÉTAL CHAUD provenant du découpage ou du gougeage à l'arc risque de provoquer un incendie ou une explosion.

- Ne pas découper ou gouger à proximité de produits inflammables.
- Attention aux risques d'incendie: tenir un extincteur à proximité.



L'AIR COMPRIMÉ risque de provoquer des blessures ou même la mort.

- Avant d'intervenir sur le circuit d'air comprimé, couper l'alimentation électrique, verrouiller et étiqueter l'appareil, détendre la pression et s'assurer que le circuit d'air ne peut être mis sous pression par inadvertance.
- Détendre la pression avant de débrancher ou de brancher des canalisations d'air.
- Avant d'utiliser l'appareil, contrôler les composants du circuit d'air comprimé, les branchements et les flexibles en recherchant tout signe de détérioration, de fuite et d'usure.

- Ne pas diriger un jet d'air vers soi–même ou vers autrui.
- Pour intervenir sur un circuit d'air comprimé, porter un équipement de protection tel que des lunettes de sécurité, des gants de cuir, une chemise et un pantalon en tissu résistant, des chaussures montantes et une coiffe.
- Pour rechercher des fuites, utiliser de l'eau savonneuse ou un détecteur à ultrasons, jamais les mains nues. En cas de détection de fuite, ne pas utiliser l'équipement.
- Remettre les portes, panneaux, recouvrements ou dispositifs de protection quand l'entretien est terminé et avant de mettre en marche l'appareil.
- En cas d'injection d'air dans la peau ou le corps, demander immédiatement une assistance médicale.

L'INHALATION D'AIR COMPRIMÉ risque de provoquer des blessures ou même la mort.

- Ne pas inhaler d'air comprimé.
- Utiliser l'air comprimé uniquement pour découper ou gouger ainsi que pour l'outillage pneumatique.

Une PRESSION D'AIR RÉSIDUELLE ET DES FLEXIBLES QUI FOUETTENT risquent de provoquer des blessures.

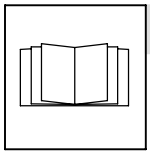
- Détendre la pression pneumatique des outils et circuits avant d'entretenir, ajouter ou changer des accessoires et avant d'ouvrir le bouchon de vidange ou de remplissage d'huile du compresseur.

Les PIÈCES MOBILES peuvent causer des blessures.

- S'abstenir de toucher des parties mobiles telles que des ventilateurs, courroies et rotors.
- Maintenir fermés et verrouillés les portes, panneaux, recouvrements et dispositifs de protection.
- Ne pas approcher les mains, cheveux, vêtements lâches et outils des organes mobiles.
- Avant d'intervenir sur le circuit d'air comprimé, couper l'alimentation électrique, verrouiller et étiqueter l'appareil, détendre la pression et s'assurer que le circuit d'air ne peut être mis sous pression par inadvertance.
- Demander seulement à un personnel qualifié d'enlever les dispositifs de sécurité ou les recouvrements pour effectuer, s'il y a lieu, des travaux d'entretien et de dépannage.
- Remettre en place les portes, panneaux, recouvrements ou dispositifs de protection à la fin des travaux d'entretien et avant de mettre le moteur en marche.

DES PIÈCES CHAUDES peuvent provoquer des brûlures graves.

- Ne pas toucher de pièces chaudes du compresseur ou du circuit d'air.
- Prévoir une période de refroidissement avant d'intervenir sur l'équipement.
- Ne pas toucher aux pièces chaudes, utiliser les outils recommandés et porter des gants de soudage et des vêtements épais pour éviter les brûlures.



LIRE LES INSTRUCTIONS.

- Lire et appliquer les instructions sur les étiquettes et le Mode d'emploi avant l'installation, l'utilisation ou l'entretien de l'appareil. Lire les informations de sécurité au début du manuel et dans chaque section.
- N'utiliser que les pièces de rechange recommandées par le constructeur.
- Effectuer l'entretien en respectant les manuels d'utilisation, les normes industrielles et les codes nationaux, d'état et locaux.

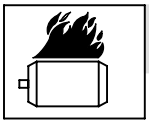
2-6. Dangers supplémentaires en relation avec l'installation, le fonctionnement et la maintenance

Risque D'INCENDIE OU D'EXPLOSION.

- Ne pas placer l'appareil sur, au-dessus ou à proximité de surfaces inflammables.
- Ne pas installer l'appareil à proximité de produits inflammables.
- Ne pas surcharger l'installation électrique – s'assurer que l'alimentation est correctement dimensionnée et protégée avant de mettre l'appareil en service.

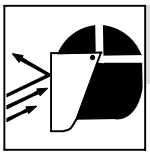
LA CHUTE DE L'ÉQUIPEMENT peut provoquer des blessures.

- Utiliser l'anneau de levage pour lever l'appareil et les accessoires correctement installées seuls, PAS les bouteilles de gaz. Ne pas dépasser le poids nominal maximal de l'œilleton (voir les spécifications).
- Utiliser un équipement de levage de capacité suffisante pour lever l'appareil.
- En utilisant des fourches de levage pour déplacer l'unité, s'assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l'appareil.
- Tenir l'équipement (câbles et cordons) à distance des véhicules mobiles lors de toute opération en hauteur.
- Suivre les consignes du Manuel des applications pour l'équation de levage NIOSH révisée (Publication Nº94–110) lors du levage manuelle de pièces ou équipements lourds.



LE SURCHAUFFEMENT peut endommager le moteur électrique.

- Arrêter ou déconnecter l'équipement avant de démarrer ou d'arrêter le moteur.
- Ne pas laisser tourner le moteur trop lentement sous risque d'endommager le moteur électrique à cause d'une tension et d'une fréquence trop faibles.
- Ne pas brancher de moteur de 50 ou de 60 Hz à la prise de 100 Hz, s'il y a lieu.



LES ÉTINCELLES PROJETÉES peuvent provoquer des blessures.

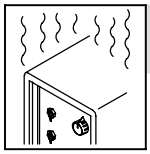
- Porter un écran facial pour protéger le visage et les yeux.
- Affûter l'électrode au tungstène uniquement à la meuleuse dotée de protecteurs. Cette manœuvre est à exécuter dans un endroit sûr lorsque l'on porte l'équipement homologué de protection du visage, des mains et du corps.
- Les étincelles risquent de causer un incendie – éloigner toute substance inflammable.

Les PIÈCES MOBILES peuvent causer des blessures.

- Ne pas s'approcher des organes mobiles.
- Ne pas s'approcher des points de coincement tels que des rouleaux de commande.

LES FILS DE SOUDAGE peuvent provoquer des blessures.

- Ne pas appuyer sur la gâchette avant d'en avoir reçu l'instruction.
- Ne pas diriger le pistolet vers soi, d'autres personnes ou toute pièce mécanique en engageant le fil de soudage.



L'EMPLOI EXCESSIF peut SURCHAUFFER L'ÉQUIPEMENT.

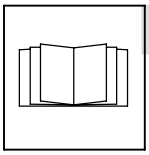
- Laisser l'équipement refroidir ; respecter le facteur de marche nominal.
- Réduire le courant ou le facteur de marche avant de poursuivre le soudage.
- Ne pas obstruer les passages d'air du poste.

LES CHARGES ÉLECTROSTATIQUES peuvent endommager les circuits imprimés.

- Établir la connexion avec la barrette de terre avant de manipuler des cartes ou des pièces.
- Utiliser des pochettes et des boîtes antistatiques pour stocker, déplacer ou expédier des cartes de circuits imprimes.

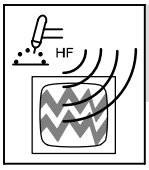
UNE REMORQUE QUI BASCULE peut provoquer des blessures.

- Utiliser les supports de la remorque ou des blocs pour soutenir le poids.
- Installer convenablement le poste sur la remorque comme indiqué dans le manuel s'y rapportant.



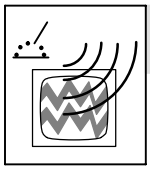
LIRE LES INSTRUCTIONS.

- Lire et appliquer les instructions sur les étiquettes et le Mode d'emploi avant l'installation, l'utilisation ou l'entretien de l'appareil. Lire les informations de sécurité au début du manuel et dans chaque section.
- N'utiliser que les pièces de rechange recommandées par le constructeur.
- Effectuer l'entretien en respectant les manuels d'utilisation, les normes industrielles et les codes nationaux, d'état et locaux.



LE RAYONNEMENT HAUTE FRÉQUENCE (H.F.) risque de provoquer des interférences.

- Le rayonnement haute fréquence (H.F.) peut provoquer des interférences avec les équipements de radio–navigation et de communication, les services de sécurité et les ordinateurs.
- Demander seulement à des personnes qualifiées familiarisées avec des équipements électroniques de faire fonctionner l'installation.
- L'utilisateur est tenu de faire corriger rapidement par un électricien qualifié les interférences résultant de l'installation.
- Si le FCC signale des interférences, arrêter immédiatement l'appareil.
- Effectuer régulièrement le contrôle et l'entretien de l'installation.
- Maintenir soigneusement fermés les portes et les panneaux des sources de haute fréquence, maintenir les éclateurs à une distance correcte et utiliser une terre et un blindage pour réduire les interférences éventuelles.



LE SOUDAGE À L'ARC risque de provoquer des interférences.

- L'énergie électromagnétique risque de provoquer des interférences pour l'équipement électronique sensible tel que les ordinateurs et l'équipement commandé par ordinateur tel que les robots.
- Veiller à ce que tout l'équipement de la zone de soudage soit compatible électromagnétiquement.
- Pour réduire la possibilité d'interférence, maintenir les câbles de soudage aussi courts que possible, les grouper, et les poser aussi bas que possible (ex. par terre).
- Veiller à souder à une distance de 100 mètres de tout équipement électronique sensible.
- Veiller à ce que ce poste de soudage soit posé et mis à la terre conformément à ce mode d'emploi.
- En cas d'interférences après avoir pris les mesures précédentes, il incombe à l'utilisateur de prendre des mesures supplémentaires telles que le déplacement du poste, l'utilisation de câbles blindés, l'utilisation de filtres de ligne ou la pose de protecteurs dans la zone de travail.

2-7. Proposition californienne 65 Avertissements

⚠ **Les équipements de soudage et de coupage produisent des fumées et des gaz qui contiennent des produits chimiques dont l'État de Californie reconnaît qu'ils provoquent des malformations congénitales et, dans certains cas, des cancers. (Code de santé et de sécurité de Californie, chapitre 25249.5 et suivants)**

⚠ **Les batteries, les bornes et autres accessoires contiennent du plomb et des composés à base de plomb, produits chimiques dont l'État de Californie reconnaît qu'ils provoquent des cancers et des malformations congénitales ou autres problèmes de procréation. *Se laver les mains après manipulation.***

⚠ **Ce produit contient des éléments chimiques, dont le plomb, reconnus par l'État de Californie pour leur caractère cancérogène ainsi que provoquant des malformations congénitales ou autres problèmes de procréation. *Se laver les mains après toute manipulation.***

Pour les moteurs à essence :

⚠ **Les gaz d'échappement des moteurs contiennent des produits chimiques dont l'État de Californie reconnaît qu'ils provoquent des cancers et des malformations congénitales ou autres problèmes de procréation.**

Pour les moteurs diesel :

⚠ **Les gaz d'échappement des moteurs diesel et certains de leurs composants sont reconnus par l'État de Californie comme provoquant des cancers et des malformations congénitales ou autres problèmes de procréation.**

2-8. Principales normes de sécurité

Safety in Welding, Cutting, and Allied Processes, ANSI Standard Z49.1, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

Safe Practices for the Preparation of Containers and Piping for Welding and Cutting, American Welding Society Standard AWS F4.1, from Global Engineering Documents (phone: 1-877-413-5184, website: www.global.ihs.com).

National Electrical Code, NFPA Standard 70, from National Fire Protection Association, Quincy, MA 02269 (phone: 1-800-344-3555, website: www.nfpa.org and www. sparky.org).

Safe Handling of Compressed Gases in Cylinders, CGA Pamphlet P-1, from Compressed Gas Association, 4221 Walney Road, 5th Floor, Chantilly, VA 20151 (phone: 703-788-2700, website:www.cganet.com).

Safety in Welding, Cutting, and Allied Processes, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 5060 Spectrum Way, Suite 100, Ontario, Canada L4W 5NS (phone: 800-463-6727, website: www.csa-international.org).

Battery Chargers, CSA Standard C22.2 NO 107.2–01, from Canadian Standards Association, Standards Sales, 5060 Spectrum Way, Suite 100, Ontario, Canada L4W 5NS (phone: 800-463-6727, website: www.csa-international.org).

Safe Practice For Occupational And Educational Eye And Face Protection, ANSI Standard Z87.1, from American National Standards Institute, 25 West 43rd Street, New York, NY 10036 (phone: 212-642-4900, website: www.ansi.org).

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, NFPA Standard 51B, from National Fire Protection Association, Quincy, MA 02269 (phone: 1-800-344-3555, website: www.nfpa.org.

For Standards about hydraulic systems, contact the National Fluid Power Association, Publications Department, 3333 North Mayfair Road, Suite 211, Milwaukee, WI 53222-3219 (phone: (414) 778-3344, website: www.nfpa.com).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, from U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250-7954 (phone: 1-866-512-1800) (there are 10 OSHA Regional Offices—phone for Region 5, Chicago, is 312-353-2220, website: www.osha.gov).

U.S. Consumer Product Safety Commission (CPSC), 4330 East West Highway, Bethesda, MD 20814 (phone: 301-504-7923, website: www.cpsc.gov).

Applications Manual for the Revised NIOSH Lifting Equation, The National Institute for Occupational Safety and Health (NIOSH), 1600 Clifton Rd, Atlanta, GA 30333 (phone: 1-800-232-4636, website: www.cdc.gov/NIOSH).

2-9. Informations relatives aux CEM

Le courant électrique qui traverse tout conducteur génère des champs électromagnétiques (CEM) à certains endroits. Le courant de soudage crée un CEM autour du circuit et du matériel de soudage. Les CEM peuvent créer des interférences avec certains implants médicaux comme des stimulateurs cardiaques. Des mesures de protection pour les porteurs d'implants médicaux doivent être prises: par exemple, des restrictions d'accès pour les passants ou une évaluation individuelle des risques pour les soudeurs. Tous les soudeurs doivent appliquer les procédures suivantes pour minimiser l'exposition aux CEM provenant du circuit de soudage:

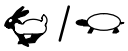
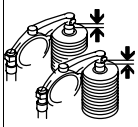
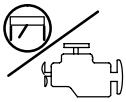
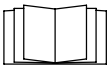
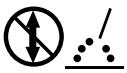
1. Rassembler les câbles en les torsadant ou en les attachant avec du ruban adhésif ou avec une housse.
2. Ne pas se tenir au milieu des câbles de soudage. Disposer les câbles d'un côté et à distance de l'opérateur.
3. Ne pas courber et ne pas entourer les câbles autour de votre corps.
4. Maintenir la tête et le torse aussi loin que possible du matériel du circuit de soudage.
5. Connecter la pince sur la pièce aussi près que possible de la soudure.
6. Ne pas travailler à proximité d'une source de soudage, ni s'asseoir ou se pencher dessus.
7. Ne pas souder tout en portant la source de soudage ou le dévidoir.

En ce qui concerne les implants médicaux :

Les porteurs d'implants doivent d'abord consulter leur médecin avant de s'approcher des opérations de soudage à l'arc, de soudage par points, de gougeage, du coupage plasma ou de chauffage par induction. Si le médecin approuve, il est recommandé de suivre les procédures précédentes.

SECTION 3 – DEFINITIONS

3-1. Symbol Definitions

Stop Engine	Fast (Run, Weld/Power)	 Fast/Slow (Run/Idle)	Slow (Idle)
Start Engine	Panel/Local	Temperature	Fuel
Engine Oil	On	 Check Valve Clearance	Battery (Engine)
 Engine	 Read Operator's Manual	**A** Amperes	**V** Volts
MIG (GMAW), Wire	Stick (SMAW)	TIG (GTAW)	Circuit Protector
Foot Control	Manual Control	Touch Start (GTAW)	Pulsed
Positive	Negative	Alternating Current (AC)	Output
Time	**h** Hours	**s** Seconds	Protective Earth (Ground)
 Do not switch while welding	**14** Remote 14 Receptacle	Work Connection	Glow Plug
Wire Feed	Electrode Positive	Electrode Negative	High Temperature

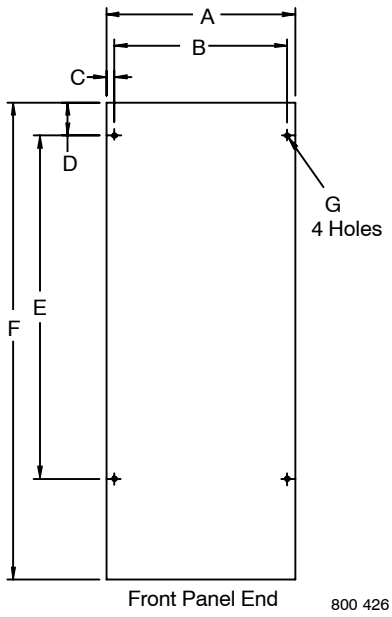
SECTION 4 – SPECIFICATIONS

4-1. Weld, Power, And Engine Specifications

Welding Mode	Rated Welding Output	Maximum Open-Circuit Voltage	Amperage Range In CC Mode	Voltage Range In CV Mode	Generator Power Rating	Fuel Capacity	Engine
CC/DC	300 A, 32 V, 60% duty Cycle	99	5 – 375 A	10 – 34 V	Single-Phase, 12 kVA/kW 100/50 A, 120/240 V AC, 60 Hz	13 gal (49 L) Tank	Kubota D1005 Water-Cooled, Three-Cylinder, Four-Cycle, 26 HP Diesel Engine
CV/DC							

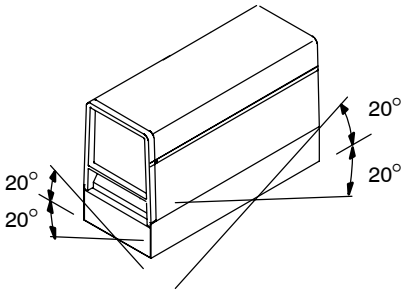
4-2. Dimensions, Weights, and Operating Angles

Dimensions	
Height	36 in (914 mm)
Width	24 in (610 mm)
Depth	59 in (1499 mm)
A	23-5/8 in (600 mm)
B	21-1/2 in (546 mm)
C	1 in (25 mm)
D	15-5/8 in (397 mm)
E	26-3/8 in (679 mm)
F	58-3/4 in (1492 mm)
G	13/32 in (10 mm) Dia.
Weight	
925 lb (420 kg), 1103 lb (455 kg) w/fuel	
Lifting Eye Weight Rating: 1150 lb (522 kg)	

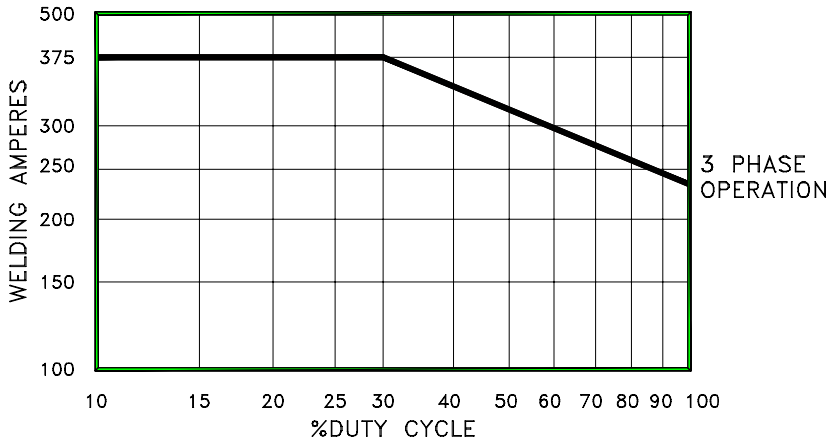


Do not exceed tilt angles or engine could be damaged or unit could tip.

Do not move or operate unit where it could tip.



4-3. Duty Cycle And Overheating

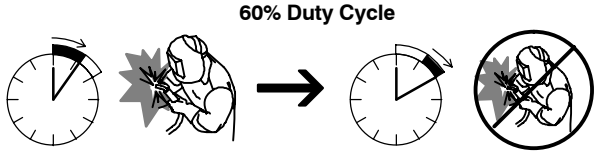


Duty Cycle is percentage of 10 minutes that unit can weld at rated load without overheating.

If unit overheats, output stops, a Help message is displayed (see Section 8-11), and cooling fan runs. Wait fifteen minutes for unit to cool. Reduce amperage or voltage, or duty cycle before welding.

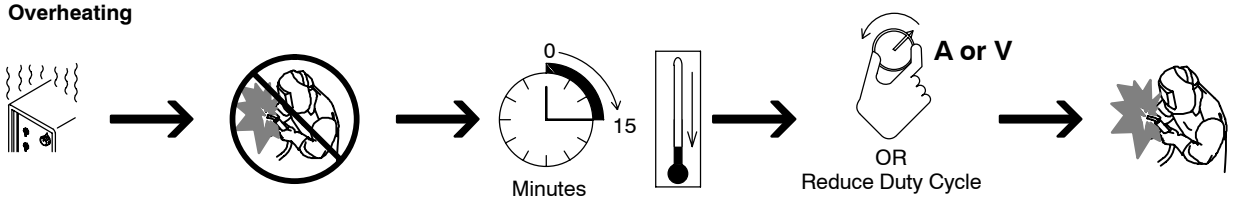
NOTICE – *Exceeding duty cycle can damage unit and void warranty.*

60% Duty Cycle



6 Minutes Welding — 4 Minutes Resting

Overheating

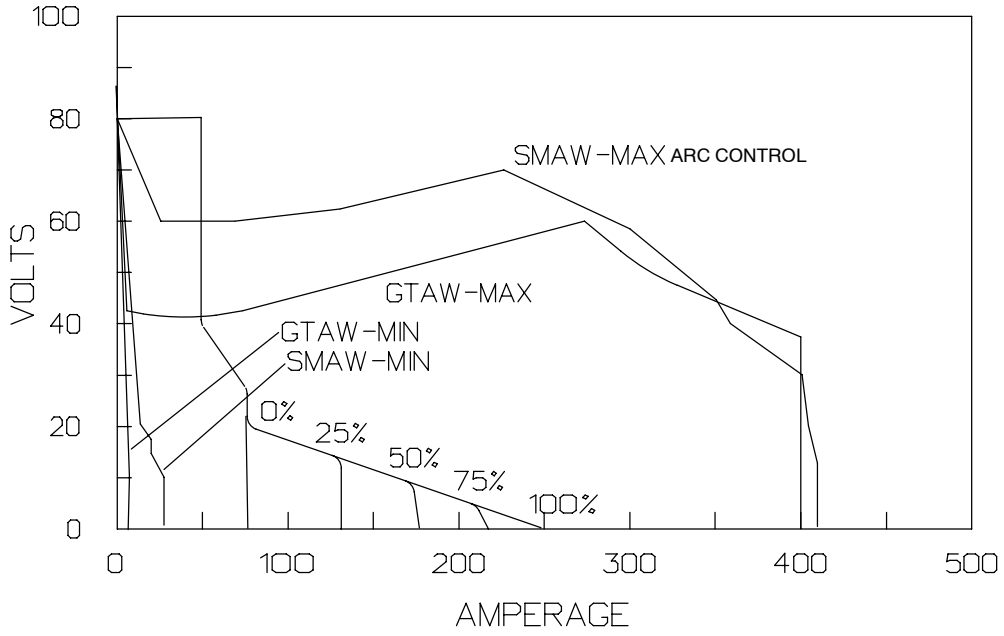


sduty1 5/95 / 196 698

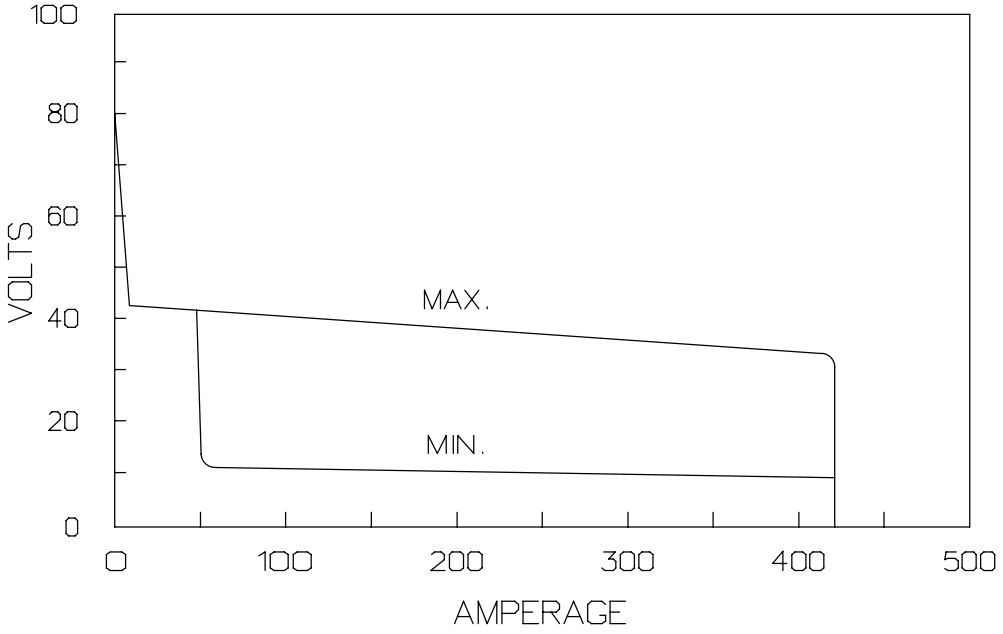
4-4. Volt-Ampere Curves

Volt-ampere curves show minimum and maximum voltage and amperage output capabilities of unit. Curves of other settings fall between curves shown.

A. CC Mode

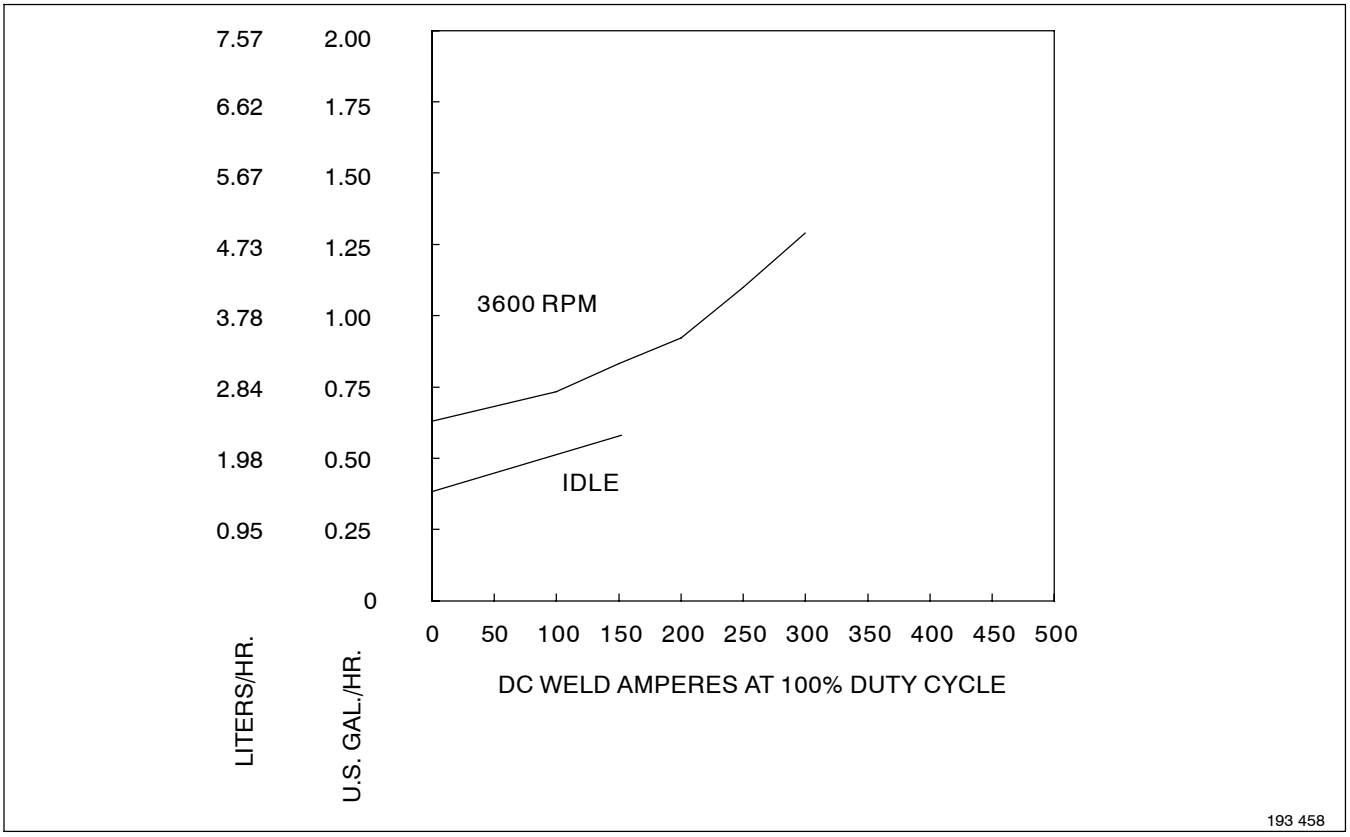


B. CV Mode

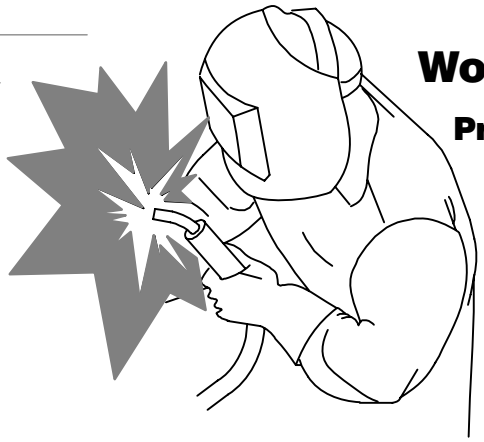


178 652 / 178 653

4-5. Fuel Consumption



Notes



Work like a Pro!

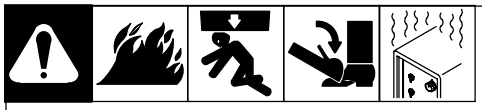
Pros weld and cut safely. Read the safety rules at the beginning of this manual.

SECTION 5 – INSTALLATION

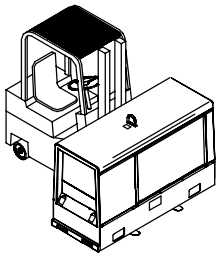
5-1. Serial Number And Rating Label Location

The serial number and rating information for this product is located on the front. Use rating label to determine input power requirements and/or rated output. For future reference, write serial number in space provided on back cover of this manual.

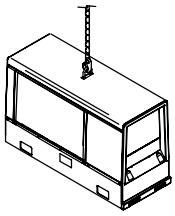
5-2. Installing Welding Generator



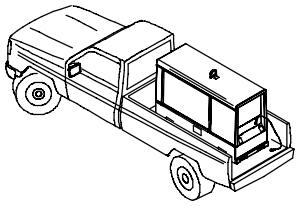
Movement



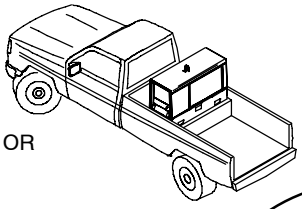
OR



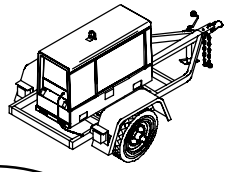
Location / Airflow Clearance

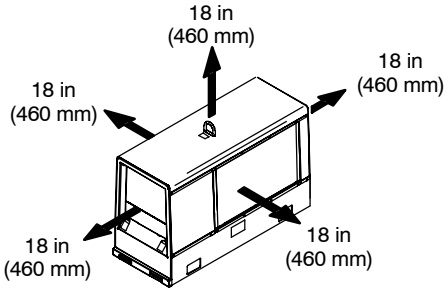


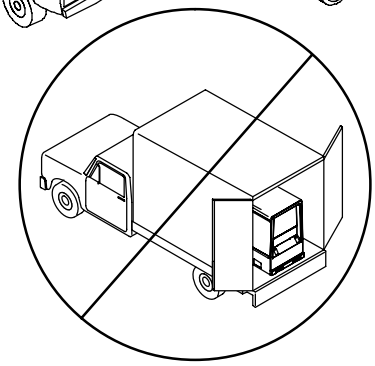
OR



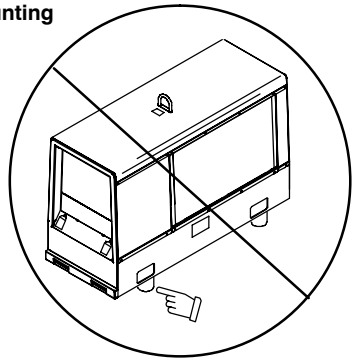
OR

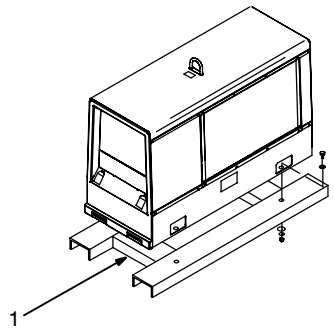






Mounting





Do not move or operate unit where it could tip.

Do not lift unit from end.

Do not weld on base. Welding on base can cause fuel tank fire or explosion. Bolt unit down using holes provided in base.

Always securely fasten welding generator onto transport vehicle or trailer and comply with all DOT and other applicable codes.

NOTICE *– Do not install unit where air flow is restricted or engine may overheat.*

☞ *See Section 4-2 for lifting eye rating.*

Mounting:

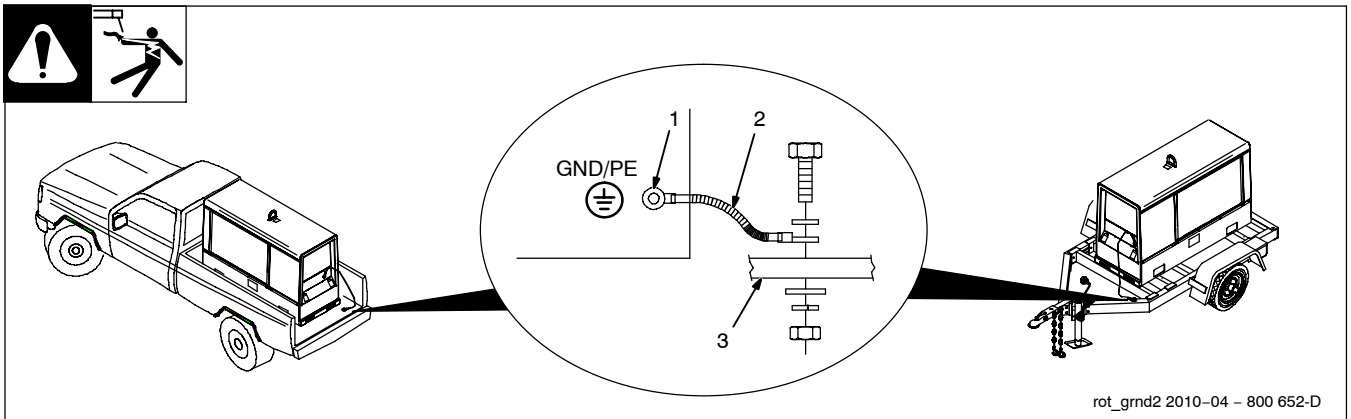
Do not mount unit by supporting the base <u>only</u> at the four mounting holes. Do not use flexible mounts. Use cross-supports to adequately support unit and prevent damage to base.

8 Cross-Supports

Mount unit on flat surface or use cross-supports to support base.

install2 2008-01 – Ref. 800 652 / Ref. 800 477-A / 803 274-A / 804 712

5-3. Grounding Generator To Truck Or Trailer Frame



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⚠ **Always ground generator frame to vehicle frame to prevent electric shock and static electricity hazards.**

⚠ **Also see AWS Safety & Health Fact Sheet No. 29, Grounding of Portable And Vehicle Mounted Welding Generators.**

⚠ **Bed liners, shipping skids, and some running gear insulate the welding generator from the vehicle frame. Always connect a ground wire from the generator equipment grounding terminal to bare metal on the vehicle frame as shown.**

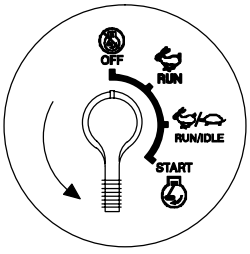
⚠ **If unit does not have GFCI receptacles, use GFCI-protected extension cord.**

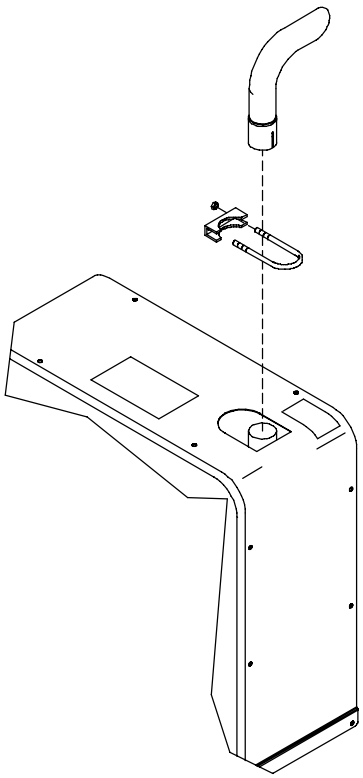
1 Equipment Grounding Terminal (On Front Panel)
2 Grounding Cable (Not Supplied)
3 Metal Vehicle Frame

Connect cable from equipment ground terminal to metal vehicle frame. Use #8 AWG or larger insulated copper wire.

☞ *Electrically bond generator frame to vehicle frame by metal-to-metal contact.*

5-4. Installing Exhaust Pipe





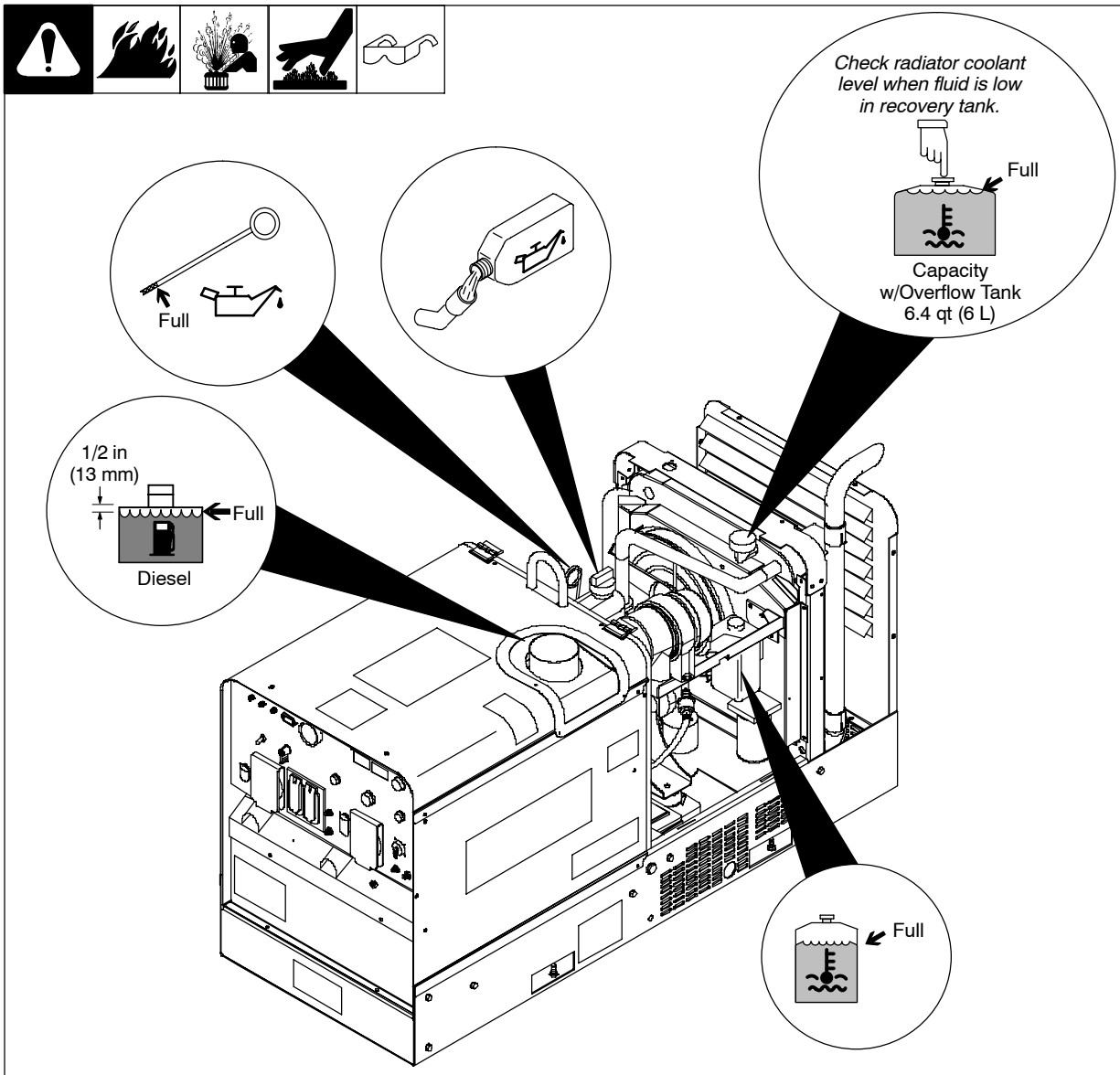
☞ *Point exhaust pipe in desired direction but always away from front panel and direction of travel.*

Tools Needed:

1/2 in

802 173-B / Ref. 213 263-B

5-5. Engine Prestart Checks



802 330-G

Check all fluids daily. Engine must be cold and on a level surface.

Engine stops if oil pressure is too low or engine temperature is too high.

☞ *This unit has a low oil pressure shutdown switch. However, some conditions may cause engine damage before the engine shuts down. Check oil level often and do not use the oil pressure shutdown system to monitor oil level.*

Follow run-in procedure in engine manual. If unburned fuel and oil collect in exhaust pipe during run-in, see Section 10.

Fuel

NOTICE *– Do not use gasoline. Gasoline will damage engine.*

Add fresh diesel fuel before starting engine the first time (see maintenance label for specifications). Fill fuel tank up to 1/2 in. (13 mm) from top to allow room for expansion.

Do not run out of fuel or air enters fuel system and causes starting problems. See engine manual to bleed air from fuel system.

Oil

After fueling, check oil with unit on level surface. If oil is not up to full mark on dipstick, add oil (see maintenance label).

NOTICE *– Engine may use oil and wetstacking may occur during run-in period. Check oil several times daily during run-in.*

Coolant

Check coolant level in recovery tank before starting unit the first time. Add coolant if coolant is below bottom of radiator filler neck (see Section 5-6 for radiator filling instructions.

Check coolant in recovery tank daily. If coolant is below Full level, add coolant until coolant level in tank is between Full and Low levels. If recovery tank coolant level was low, also check coolant level in radiator (see Section 5-6).

Engine coolant is a mixture of water and ethylene glycol base antifreeze. A solution of 50% antifreeze and 50% water must be used in this engine. Do not use 100% antifreeze or severe damage will occur.

Keep radiator and air intake clean and free of dirt.

NOTICE *– Incorrect engine temperature can damage engine. Do not run engine without a properly working thermostat and radiator cap.*

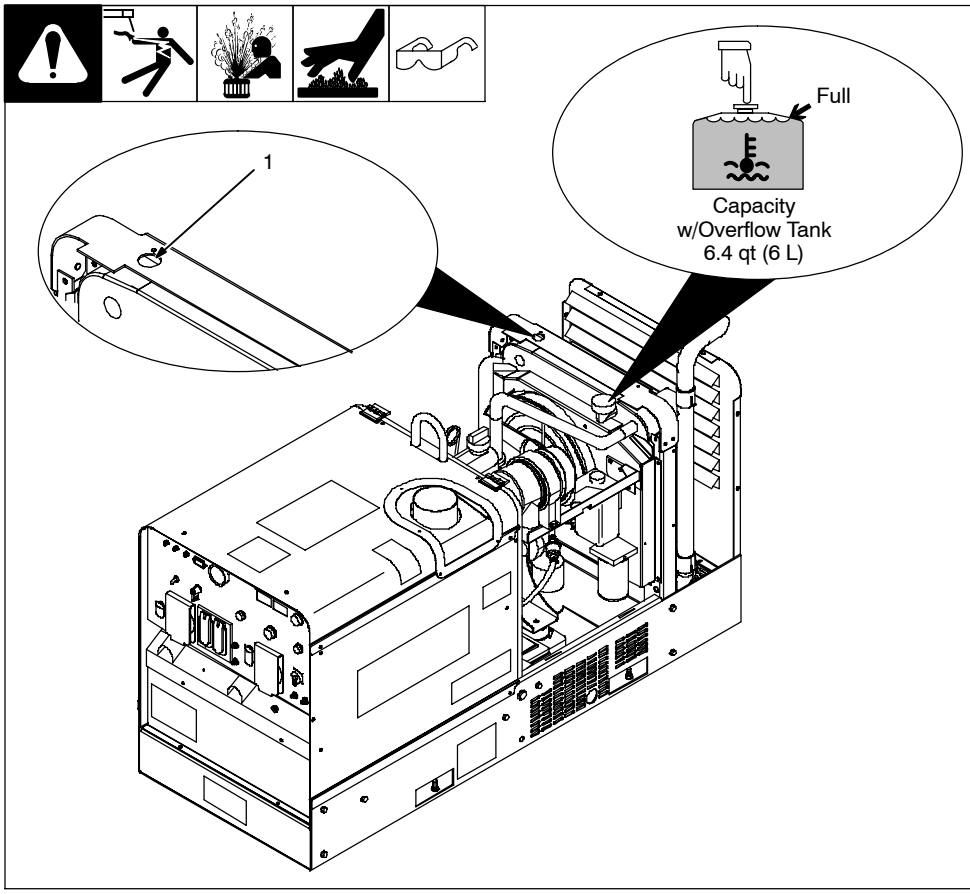
☞ *To improve cold weather starting:*

Keep battery in good condition. Store battery in warm area.

Use fuel formulated for cold weather (diesel fuel can gel in cold weather). Contact local fuel supplier for fuel information.

Use correct grade oil for cold weather operation (see Section 6-6).

5-6. Adding Coolant To Radiator



Stop engine and let cool.

☞ *Check coolant level according to Section 5-5 before starting this procedure.*

If coolant level is below bottom of radiator filler neck, add coolant as follows:

1 Radiator Air Bleed Screw

Remove radiator air bleed screw. Add coolant to radiator until coolant is at bottom of filler neck. This ensures all air is purged from the system.

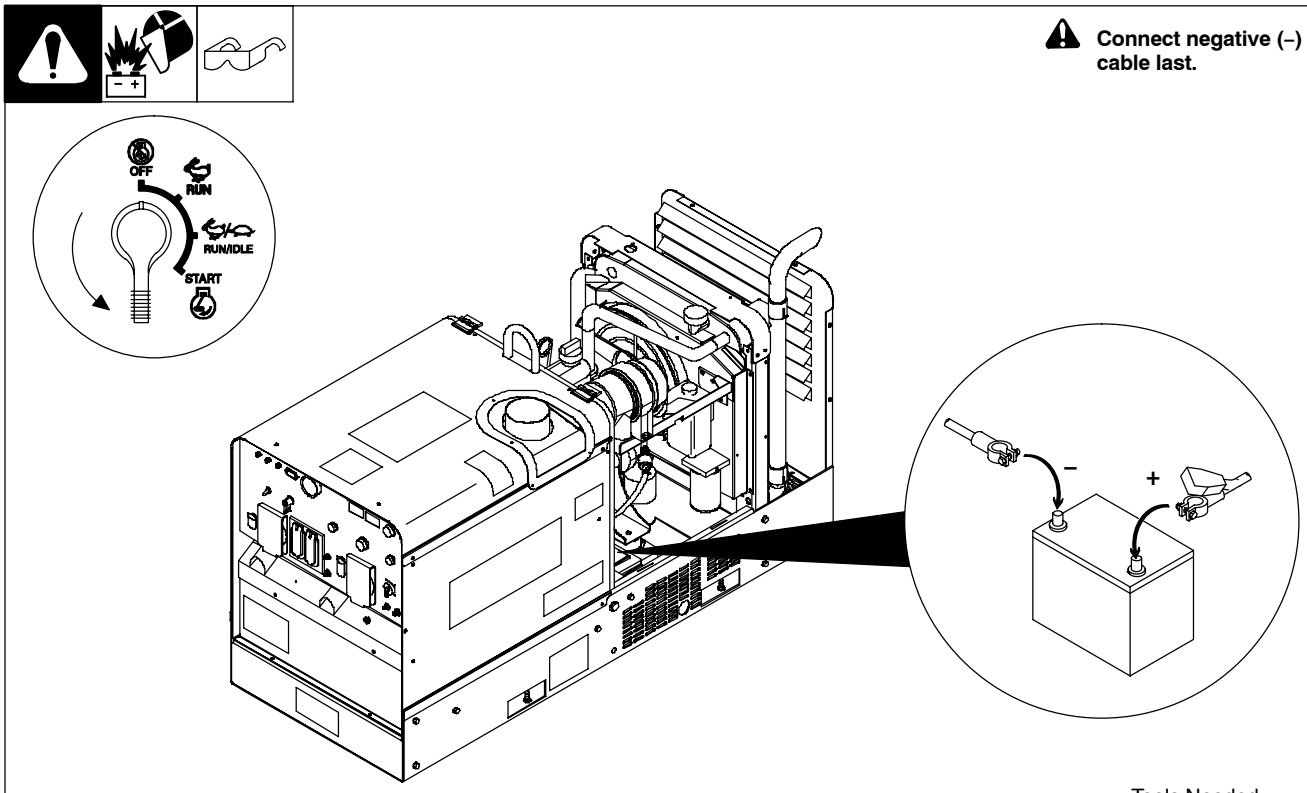
Reinstall screw and radiator cap. Check coolant level in recovery tank (see Section 5-5).

Engine coolant is a mixture of water and ethylene glycol base antifreeze. A solution of 50% antifreeze and 50% water must be used in this engine. Do not use 100% antifreeze or severe damage will occur.

Tools Needed:

Ref. 802 330-G

5-7. Connecting The Battery



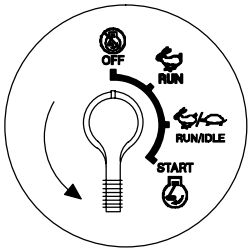
Connect negative (–) cable last.

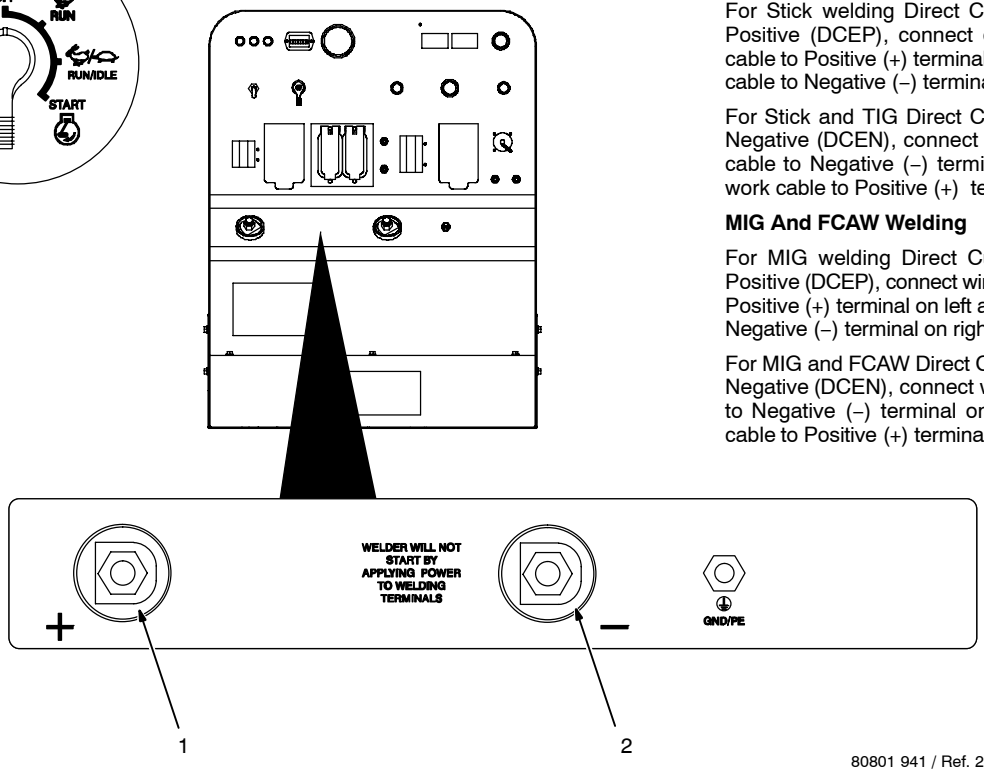
Tools Needed:

3/8, 1/2 in

Ref. 213 263-B / 802 330-G / Ref. S-0756-D

5-8. Weld Output Terminals





Stop engine.

1 Positive (+) Weld Output Terminal

2 Negative (–) Weld Output Terminal

Stick And TIG Welding

For Stick welding Direct Current Electrode Positive (DCEP), connect electrode holder cable to Positive (+) terminal on left and work cable to Negative (–) terminal on right.

For Stick and TIG Direct Current Electrode Negative (DCEN), connect electrode holder cable to Negative (–) terminal on right and work cable to Positive (+) terminal on left.

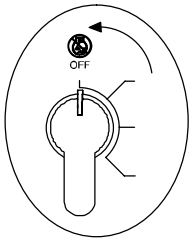
MIG And FCAW Welding

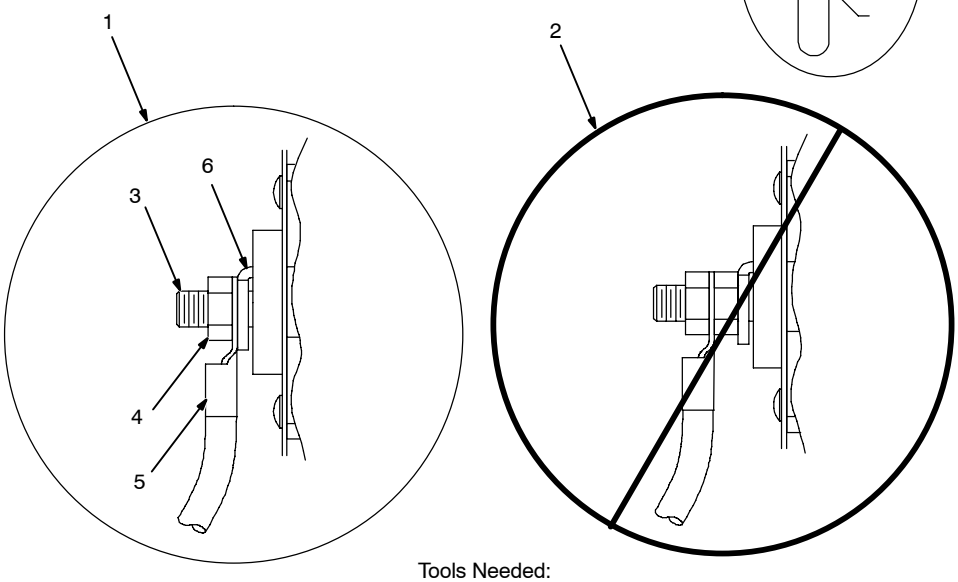
For MIG welding Direct Current Electrode Positive (DCEP), connect wire feeder cable to Positive (+) terminal on left and work cable to Negative (–) terminal on right.

For MIG and FCAW Direct Current Electrode Negative (DCEN), connect wire feeder cable to Negative (–) terminal on right and work cable to Positive (+) terminal on left.

80801 941 / Ref. 213 263-B / 802 174-E

5-9. Connecting To Weld Output Terminals





Stop engine.

Failure to properly connect weld cables may cause excessive heat and start a fire, or damage your machine.

☞ *Do not place anything between weld cable terminal and copper bar. Make sure that the surfaces of the weld cable terminal and copper bar are clean.*

1 Correct Weld Cable Connection

2 Incorrect Weld Cable Connection

3 Weld Output Terminal

4 Supplied Weld Output Terminal Nut

5 Weld Cable Terminal

6 Copper Bar

Remove supplied nut from weld output terminal. Slide weld cable terminal onto weld output terminal and secure with nut so that weld cable terminal is tight against copper bar.

Tools Needed:

3/4 in.

803 778-B

5-10. Selecting Weld Cable Sizes*

NOTICE *– The Total Cable Length in Weld Circuit (see table below) is the combined length of both weld cables. For example, if the power source is 100 ft (30 m) from the workpiece, the total cable length in the weld circuit is 200 ft (2 cables x 100 ft). Use the 200 ft (60 m) column to determine cable size.*

Weld Output Terminals

Turn off power before connecting to weld output terminals.

Do not use worn, damaged, undersized, or poorly spliced cables.

Welding Amperes	Weld Cable Size** and Total Cable (Copper) Length in Weld Circuit Not Exceeding***							
	100 ft (30 m) or Less		150 ft (45 m)	200 ft (60 m)	250 ft (70 m)	300 ft (90 m)	350 ft (105 m)	400 ft (120 m)
	10 – 60% Duty Cycle	60 – 100% Duty Cycle	10 – 100% Duty Cycle					
100	4 (20)	4 (20)	4 (20)	3 (30)	2 (35)	1 (50)	1/0 (60)	1/0 (60)
150	3 (30)	3 (30)	2 (35)	1 (50)	1/0 (60)	2/0 (70)	3/0 (95)	3/0 (95)
200	3 (30)	2 (35)	1 (50)	1/0 (60)	2/0 (70)	3/0 (95)	4/0 (120)	4/0 (120)
250	2 (35)	1 (50)	1/0 (60)	2/0 (70)	3/0 (95)	4/0 (120)	2 ea. 2/0 (2x70)	2 ea. 2/0 (2x70)
300	1 (50)	1/0 (60)	2/0 (70)	3/0 (95)	4/0 (120)	2 ea. 2/0 (2x70)	2 ea. 3/0 (2x95)	2 ea. 3/0 (2x95)
350	1/0 (60)	2/0 (70)	3/0 (95)	4/0 (120)	2 ea. 2/0 (2x70)	2 ea. 3/0 (2x95)	2 ea. 3/0 (2x95)	2 ea. 4/0 (2x120)

* This chart is a general guideline and may not suit all applications. If cable overheats, use next size larger cable.

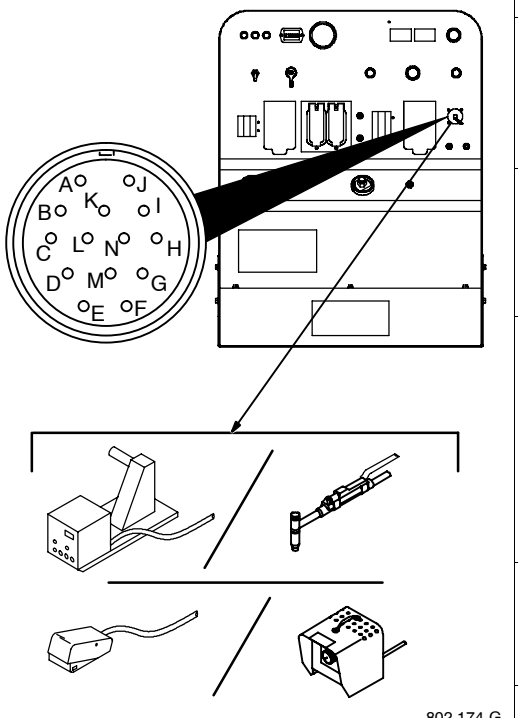
**Weld cable size (AWG) is based on either a 4 volts or less drop or a current density of at least 300 circular mils per ampere.
( ) = mm^2 for metric use

***For distances longer than those shown in this guide, call a factory applications rep. at 920-735-4505 (Miller) or 1-800-332-3281 (Hobart)

Ref. S-0007-G 2009-08

5-11. Remote 14 Receptacle RC14 Information

☞ *Engine runs at weld/power speed whenever a device connected to the remote 14 receptacle is running.*

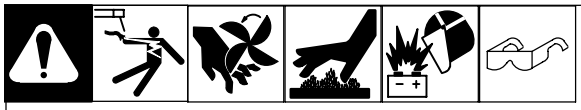


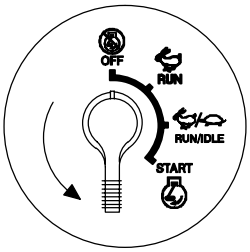
802 174-G

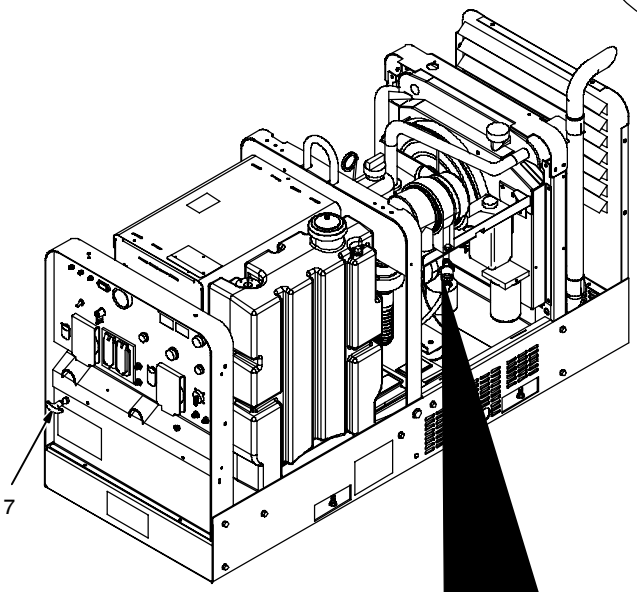
REMOTE 14	Socket*	Socket Information
24 VOLTS AC OUTPUT (CONTACTOR)	A	24 volts AC. Protected by supplementary protector CB6.
	B	Contact closure to A completes 24 volts AC contactor control circuit.
115 VOLTS AC OUTPUT (CONTACTOR)	I	115 volts AC. Protected by supplementary protector CB5.
	J	Contact closure to I completes 115 volts AC contactor control circuit.
REMOTE OUTPUT CONTROL	C	Output to remote control; 0 to +10 volts dc, +10 volts DC in MIG mode.
	D	Remote control circuit common.
	E	0 to +10 volts DC input command signal from remote control.
	M	CC/CV select.
A/V AMPERAGE VOLTAGE	F	Current feedback; +1 volt DC per 100 amperes.
	H	Voltage feedback; +1 volt DC per 10 output receptacle volts.
GND	G	Circuit common for 24 and 115 volts AC circuits.
	K	Chassis common.

*The remaining sockets are not used.

5-12. Guidelines For Installing Customer-Supplied Emergency Air Shutdown Valve







A customer-supplied emergency air shutdown valve can be installed to stop the engine immediately in emergency situations.

These guidelines show the typical installation of a Gator ESD 175-275-L3 air shutdown valve. Installation of other air shutdown valves may differ from that shown. Contact the air shutdown valve manufacturer or a Factory Authorized Service Agent for additional installation and operation information.

Stop engine, and let cool.

Disconnect battery negative (–) cable.

Open doors and remove side panels.

1 Air Cleaner

2 2 in (51 mm) Hose Clamp

3 1-3/4 x 2 in (44 x 51 mm) Rubber Hose

4 Air Shutdown Valve (Gator ESD 175-275-L3)

5 1-3/4 x 16-1/2 in (44 x 419 mm) Flexible Radiator Hose (NAPA Part No. FM68)

☞ *Use thick-walled rubber hose. Do not use heater hose. (Heater hose could let dirt into engine.)*

6 Engine Air Inlet

7 Shutdown Control

8 42 in (1067 mm) Shutdown Control Cable (Supplied By Gator)

9 Shutdown Valve Reset Lever

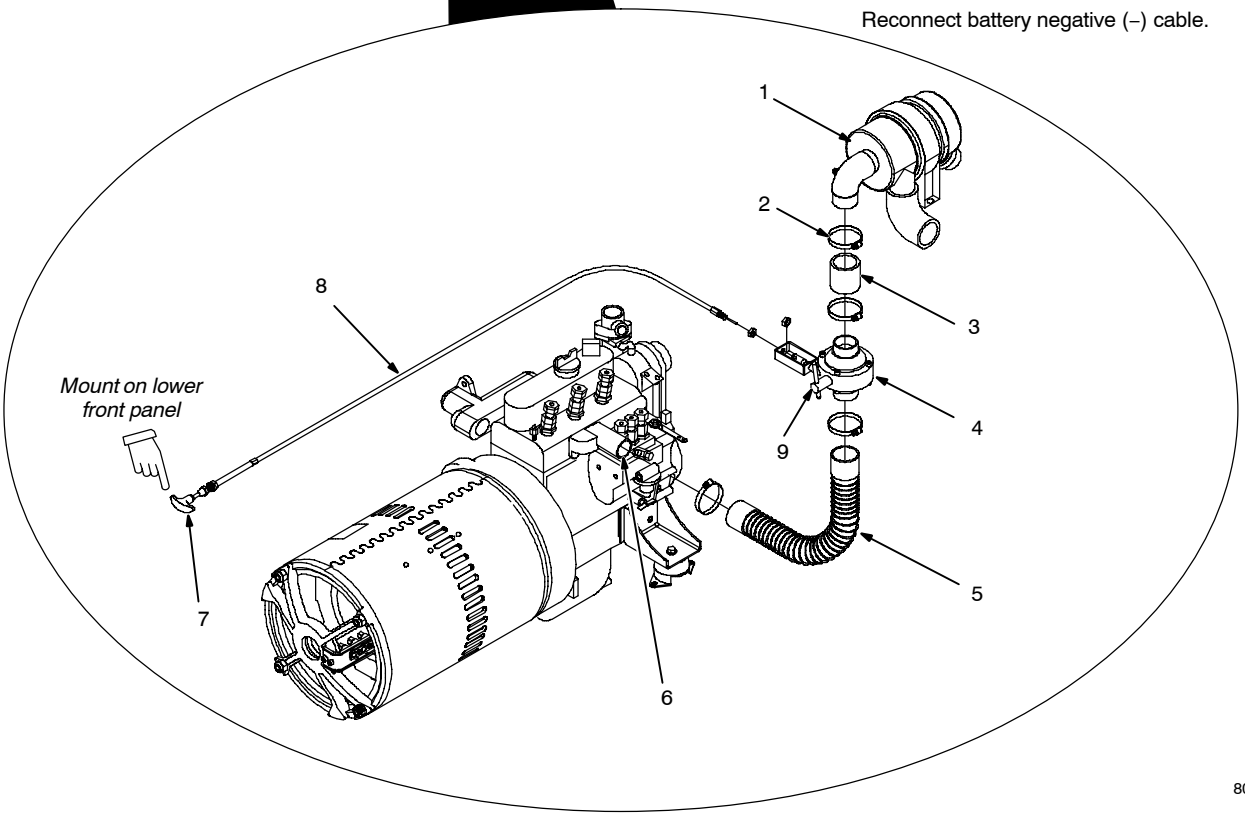
Install components as shown.

Be sure air shutdown valve is installed with air flow arrow pointing toward air inlet. Use cable ties to keep air shutdown system components away from hot or moving parts.

Verify the emergency air shutdown system operates correctly. After testing, use reset lever to reset air shutdown valve.

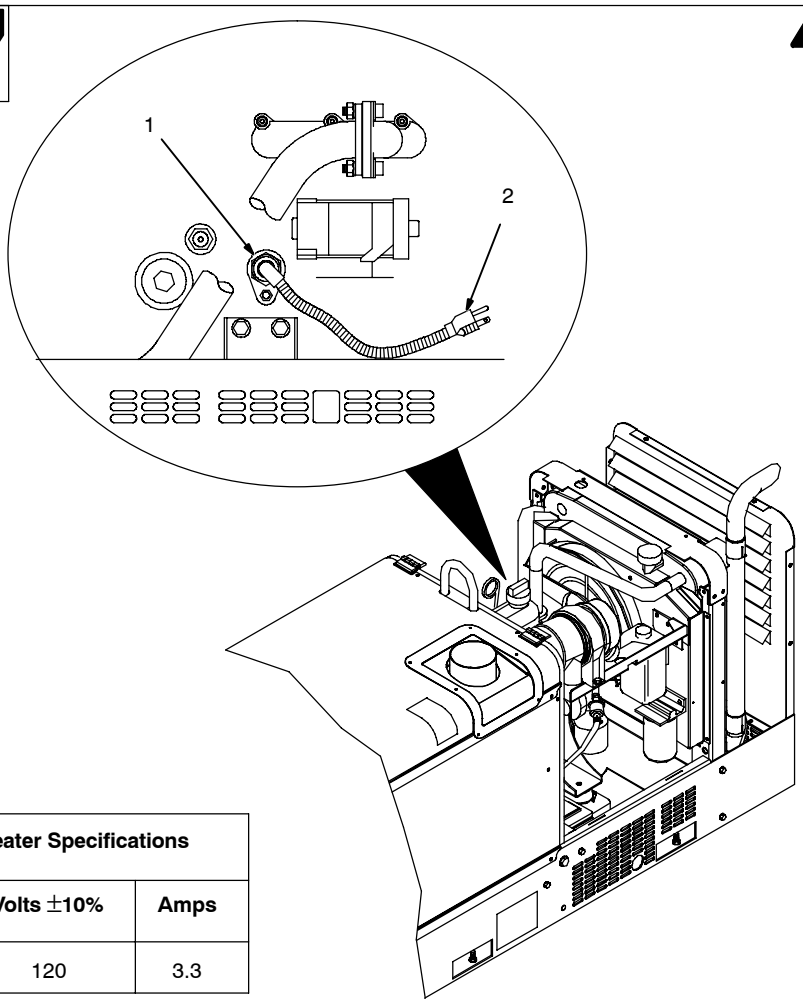
Reinstall side panels and close doors.

Reconnect battery negative (–) cable.



803 390

5-13. Operating Engine Block Heater



Do not touch hot engine block. Engine block gets hot near heater.

NOTICE – *Do not run engine while coolant heater is on.*

1 Coolant Heater

2 Heater Plug

Use heater to maintain a constant engine coolant temperature. See table for heater specifications.

To turn on heater, connect heater plug to a 120 volt ac grounded receptacle.

To turn off heater, disconnect plug.

Coolant Heater Specifications		
Watts	**Volts ±10%**	**Amps**
400	120	3.3

Ref. 802 330 / 803 393

Notes

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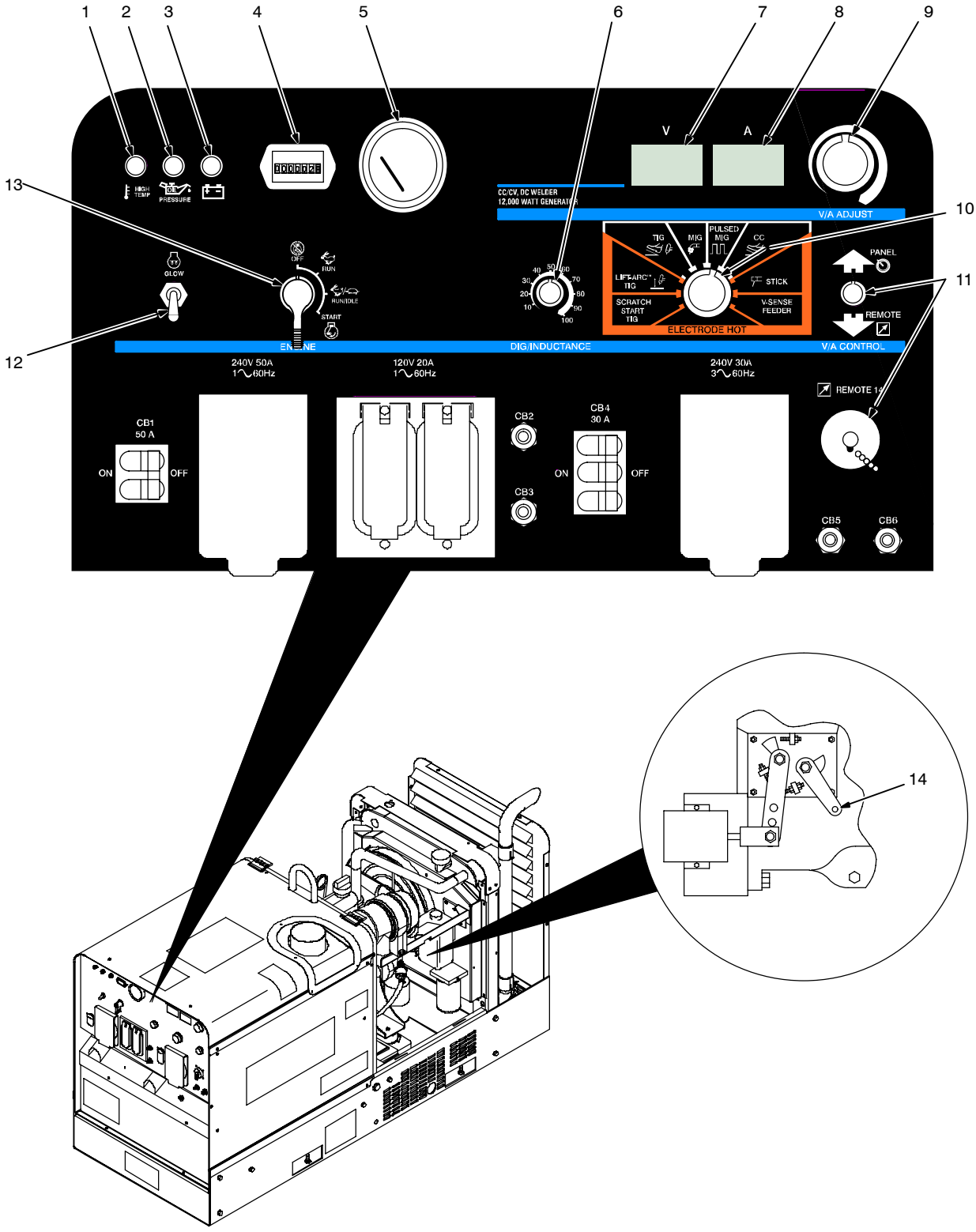
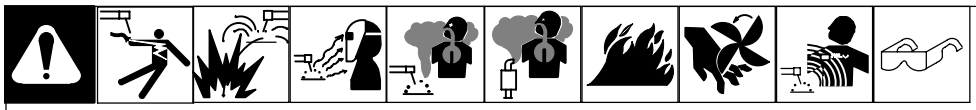
SECTION 6 – OPERATING WELDING GENERATOR

6-1. Controls (See Section 6-2)



Ref. 213 263-B / 802 330-G

6-2. Description Of Controls (See Section 6-1)



☞ *The fan motor is thermostatically controlled and only runs when cooling is needed.*

Engine Lights

1 Engine Temperature Light

Light goes on and engine stops if engine temperature is too high.

NOTICE *– Stop engine and fix trouble if Engine Temperature light goes on.*

2 Engine Oil Pressure Light

Light goes on and engine stops if oil pressure is too low. Light goes on momentarily during start-up but goes out when engine reaches normal oil pressure.

NOTICE *– Stop engine and fix trouble if Engine Oil Pressure light stays on after start-up.*

3 Battery Charging Light

Light goes on if engine alternator is not charging battery. Engine continues to run.

NOTICE *– Stop engine and fix trouble if Battery Charging light goes on.*

Engine Gauges

4 Engine Hour Meter

Use hour meter to help schedule routine maintenance.

5 Fuel Gauge

Weld Controls

6 Dig/Inductance Control

Control adjusts Dig when Stick mode is selected on mode switch. When control is set toward minimum, short-circuit amperage at low arc voltage is the same as normal welding amperage.

When set toward maximum, short-circuit amperage is increased at low arc voltage to assist with arc starts and help prevent the electrode from sticking while welding (see volt-ampere curves in Section 4-4).

Select setting best suited for application.

Control adjusts inductance when MIG or V-Sense Feeder position is selected on the mode switch. Inductance determines the "wetness" of the weld puddle. When set toward maximum, "wetness" (puddle fluidity) increases.

Control is not functional when Pulsed MIG or one of the TIG modes is selected.

7 Voltmeter

Meter displays weld voltage and help messages (see Sections 6-3 and 8-11).

8 Ammeter

Meter displays weld amperage and help messages (see Sections 6-3 and 8-11).

9 V/A (Voltage/Amperage) Adjustment Control

10 Mode Switch

The Mode switch setting determines both the process and output On/Off control (see Section 6-4). Source of control (panel or remote) for the amount of output is selected by the V/A Control switch.

For Air Carbon Arc (CAC-A) cutting and gouging, place switch in Stick position. For best results, place Dig/Inductance control in the maximum position.

11 V/A (Voltage/Amperage) Control Switch And Remote 14 Receptacle

For front panel control, place switch in Panel position and use the V/A Adjustment control.

For remote control, make connections to Remote 14 receptacle (see Section 5-11), and place switch in Remote position. In most modes, remote control is a percent of V/A Adjustment control setting (value selected on V/A Adjustment control is maximum available on remote). In the MIG mode, remote control provides full range of unit output regardless of V/A Adjust control setting.

Engine Starting Controls

12 Glow Plug Switch

Use switch to energize glow plugs for cold weather starting. Glow plugs warm in about six seconds and engine can be started (see starting instructions following).

NOTICE *– Do not use glow plug longer than 20 seconds.*

13 Engine Control Switch

Use switch to start engine, select speed, and stop engine. In Run/Idle position, engine runs at idle speed at no load, and weld/power speed under load. In Run position, engine runs at weld/power speed.

To Start:

NOTICE *– Do not use ether as a starting aid. Using ether voids warranty.*

Above 32° F: turn Engine Control switch to Start. Release switch when engine starts and Engine Oil Pressure light goes out.

☞ *If engine does not start, let engine come to a complete stop before attempting restart.*

Below 32° F: turn engine control switch to Run/Idle position. Push Glow Plug switch up and hold about six seconds. Turn Engine Control switch to Start. Release switch when engine starts and Engine Oil Pressure light goes out.

See Section 6-6 for additional information on cold weather operation.

☞ *If engine does not start, let engine come to a complete stop before attempting restart.*

To Stop: turn Engine Control switch to Off position.

☞ *Push engine stop lever to stop engine if Engine Control switch does not work (see item 14).*

14 Engine Stop Lever

Use lever to stop engine if Engine Control switch does not work.

6-3. Meter Functions

☞ *The meters display the actual weld output values for approximately three seconds after the arc is broken.*

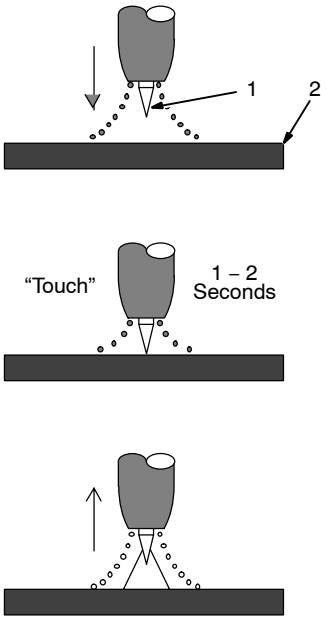
Mode	Meter Reading At Idle		Meter Reading While Welding	
Scratch Start TIG	V **80.0** Actual Volts (OCV)	A **85** Preset Amps	V **10.3** Actual Volts	A **85** Actual Amps
Lift-Arc TIG	V **7.0** Actual Volts	A **85** Preset Amps	V **10.3** Actual Volts	A **85** Actual Amps
TIG	V Blank	A **85** Preset Amps	V **10.3** Actual Volts	A **85** Actual Amps
MIG	V **24.5** Preset Volts	A Blank	V **24.5** Actual Volts	A **250** Actual Amps
Pulsed MIG	V **PPP** Pulse Display	A **PPP** Pulse Display	V **24.5** Actual Volts	A **250** Actual Amps
CC	V Blank	A **85** Preset Amps	V **24.5** Actual Volts	A **85** Actual Amps
Stick	V **80.0** Actual Volts (OCV)	A **85** Preset Amps	V **24.5** Actual Volts	A **85** Actual Amps
V-Sense Feeder	V **80.0** Flashes OCV And Preset	A Blank	V **24.5** Actual Volts	A **250** Actual Amps

6-4. Mode Switch Settings

☞ *The Stick and CC modes provide the* Adaptive Hot Start™ *feature, which automatically increases the output amperage at the start of a weld should the start require it. This eliminates electrode sticking at arc start.*

Mode Switch Setting	Process	Output On/Off Control
Scratch Start TIG	GTAW	Electrode Hot
Lift-Arc TIG	GTAW – See Section 6-5	Electrode Hot
TIG	GTAW With HF Unit, Pulsing Device, Or Remote Control	At Remote 14
MIG	GMAW	At Remote 14
Pulsed MIG	GMAW-P (Requires an external pulsing device.)	At Remote 14
CC	Stick (SMAW) With Remote On/Off	At Remote 14
Stick	SMAW	Electrode Hot
V-Sense Feeder	MIG (GMAW) With Voltage Sensing Wire Feeder	Electrode Hot

6-5. Lift-Arc™ TIG Procedure



Do NOT Strike Like A Match!

With Mode Switch in the Lift-Arc TIG position, start an arc as follows:

1 TIG Electrode

2 Workpiece

Touch tungsten electrode to workpiece at weld start point, **hold electrode to workpiece for 1-2 seconds**, and slowly lift electrode. An arc will form when electrode is lifted.

Normal open-circuit voltage is not present before tungsten electrode touches workpiece; only a low sensing voltage is present between electrode and workpiece. The solid-state output contactor does not energize until after electrode is touching workpiece. This allows electrode to touch workpiece without overheating, sticking, or getting contaminated.

Ref. S-156 279

6-6. Recommendations For Extreme Cold Weather Operation

☞ *For more information on operating in cold weather, contact the nearest Factory Authorized Service Agent or Kubota Service Center.*

Fuel

- Use an arctic-grade diesel fuel and keep fuel tank at least half full to prevent fuel lines from draining back into tank.
- Do not use gasoline or kerosene.
- Do not use fuel additives.

Oil

- Use 10W30 oil when operating at ambient temperatures above -4° F (–20° C).
- Use 5W30 oil when operating at ambient temperatures above -13° F (–25° C).
- Operating at extremely low temperatures thickens engine oil and reduces cranking speed. Contact a Factory Authorized Service Agent or Kubota Service Center for information on using 0W20 oil in these conditions. Low temperature oil must be replaced as ambient operating temperatures increase.

Coolant

- Be sure the cooling system is completely filled with a 50/50 antifreeze/water mix (open the radiator vent when filling). Do not mix antifreeze and water solution in the overflow tank. Use a premixed 50/50 antifreeze/water solution to "top off" overflow tank. Use caution if rerouting cooling lines. **Engine damage due to lack of coolant or incorrect coolant mix is not covered by the warranty**.
- A 50/50 antifreeze/water mix protects engine to -34° F (–37° C). If operating at even lower temperatures, contact a Factory Authorized Service Agent or Kubota Service Center for coolant information.

Battery

- Replacement Battery Rating: 12 Volt, 535 CCA (minimum) 90 RSV Group 55.
- Check connections at battery, starter, and engine block. Inspect battery cables for abrasion and wear, and verify the battery is secured.
- Consider installing easily-accessible battery booster leads (0 or 00 AWG) to provide easy connection to a service truck's battery.
- Boost the starting capability of the battery by using a battery heater.

Starting

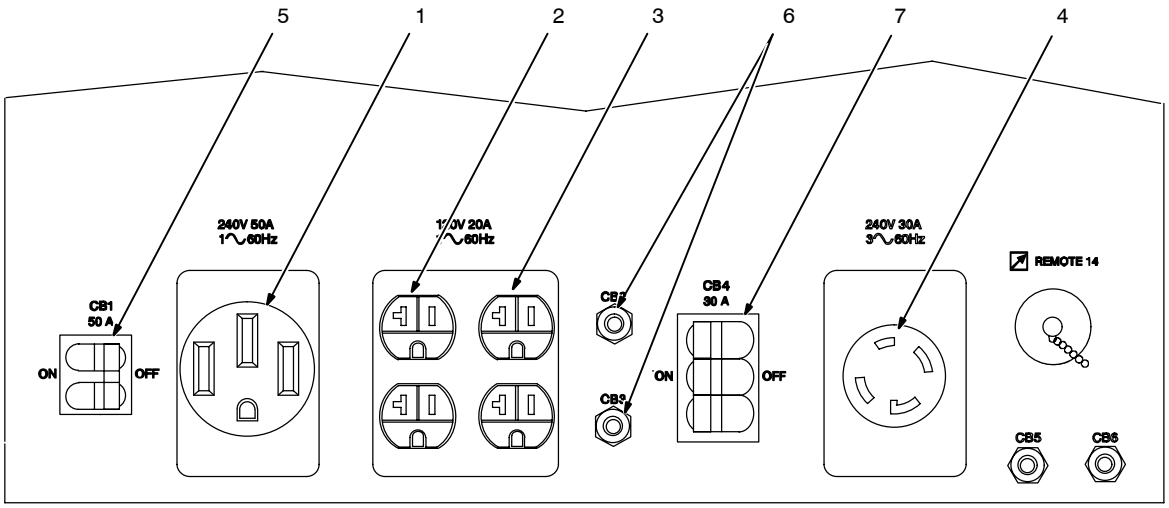
- **Do not use ether.**
- Use the engine block heater to maintain engine temperature above ambient temperature.
- Use the glow plugs for 20–30 seconds before starting. As a preseason check, make sure the glow plugs are working properly.
- Disconnect all unnecessary loads from generator ac receptacles when starting.

Operating

- To reduce crankcase condensation and breather tube freezing problems, allow engine to reach normal operating temperature as quickly as possible.
- Crankcase breather tubes will collect condensation and freeze if the hose is improperly routed. The breather tube should be free of sharp bends and kinks. A blocked breather tube will cause excessive crankcase pressure that will blow out the safety plug, oil seals, or dipstick. Contact a Factory Authorized Service Agent to obtain a shorter breather hose that is less likely to kink.
- Inspect the routing and condition of the breather tube frequently. Reroute or replace the hose if necessary.
- For <u>continuous</u> use in extreme cold, block the cooling holes in the base to reduce air flow through the radiator and achieve higher engine temperature. Close off the base inlet vents only if the engine coolant or oil temperatures can be monitored to ensure they remain within the specified limits.
- To obtain warmer air for combustion, turn the air cleaner inlet away from the inlet vents, and seal the inlet vents.
- If operating in cold weather all the time, consider replacing the existing radiator cooling fan with a smaller fan that draws less air through the radiator. Operation in warmer temperatures would require an additional "booster" electric fan to adequately cool the engine.

SECTION 7 – OPERATING AUXILIARY EQUIPMENT

7-1. Generator Power Receptacles And Circuit Breakers



8

SIMULTANEOUS WELDING AND AUXILIARY POWER				
Weld Current In Amperes	**Total Power In Watts**	**120 V Receptacle Amperes**	**Single-Phase 240 V Receptacle Amperes**	**Three-Phase 240 V Receptacle Amperes**
350	11900	–	–	–
300	9600	16	5	4
250	7500	38	15	10
200	5600	40	30	13
150	3900	40	35	19
100	2400	40	40	23
50	1100	40	45	26
0	0	40	50	30

213 263-B

If unit does not have GFCI receptacles, use GFCI-protected extension cord.

☞ *Generator power decreases as weld current increases.*

1 240 V 50 A AC Receptacle RC1

RC1 supplies 60 Hz single-phase power at weld/power speed. Maximum output is 12 kVA/kW.

2 120 V 20 A AC Duplex Receptacle RC2

3 120 V 20 A AC Duplex Receptacle RC3

RC2 and RC3 supply 60 Hz single-phase power at weld/power speed. Maximum output from RC2 or RC3 is 2.4 kVA/kW.

4 240 V 30 A, AC Twistlock Receptacle RC4

RC4 supplies 60 Hz three-phase power at weld/power speed. Maximum output is 12 kVA/kW.

5 Supplementary Protector CB1

CB1 protects RC1, RC2, and RC3 from overload. If CB1 opens, RC1, RC2, and RC3 do not work. Place switch in On position to reset.

6 Supplementary Protectors CB2 And CB3

CB2 protects RC2 and CB3 protects RC3 from from overload. If CB2 or CB3 opens, the receptacle does not work. Press button to reset.

7 Supplementary Protector CB4

CB4 protects RC4 from overload. If CB4 opens, the receptacle does not work. Place switch in On position to reset.

☞ *If a supplementary protector continues to open, contact Factory Authorized Service Agent.*

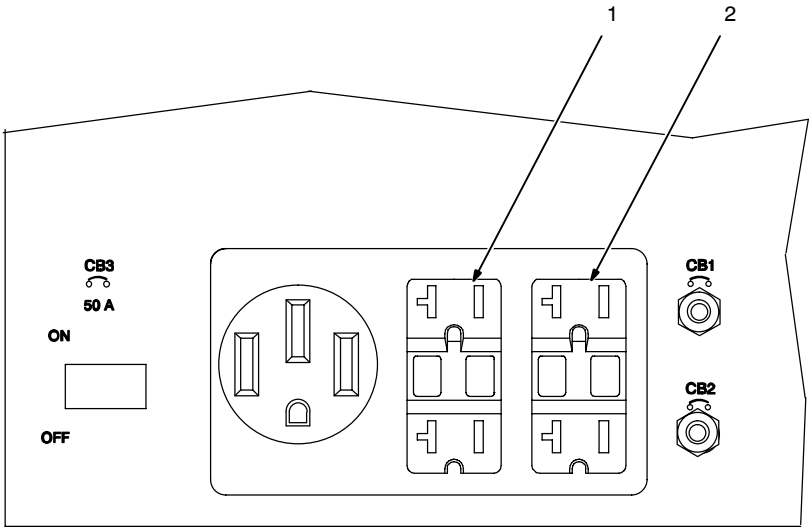
Combined output of all receptacles limited to 12 kVA/kW rating of the generator.

EXAMPLE: If 13 A is drawn from RC2 and RC3, only 37 A is available at RC1:

2 x (120 V x 13 A) + (240 V x 28 A) = 12 kVA/kW

8 Generator Power While Welding Table

7-2. Optional GFCI Receptacles And Circuit Breakers



If unit does not have GFCI receptacles, use GFCI-protected extension cord.

☞ *Generator power decreases as weld current increases.*

1 120 V 20 A AC GFCI Duplex Receptacle GFCI-2

2 120 V 20 A AC GFCI Duplex Receptacle GFCI-3

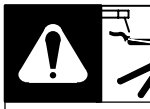
GFCI-2 and GFCI-3 supply 60 Hz single-phase power at weld/power speed. Maximum output from GFCI-2 or GFCI-3 is 2.4 kVA/kW. Circuit protection is the same as standard receptacles.

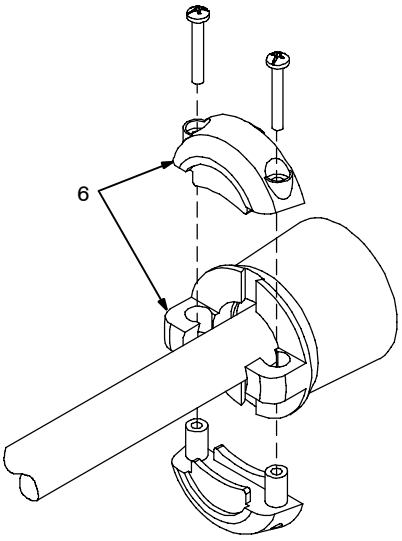
If a ground fault is detected, the GFCI Reset button pops out and the circuit opens to disconnect the faulty equipment. Check for damaged tools, cords, plugs, etc. connected to the receptacle. Press button to reset receptacle and resume operation.

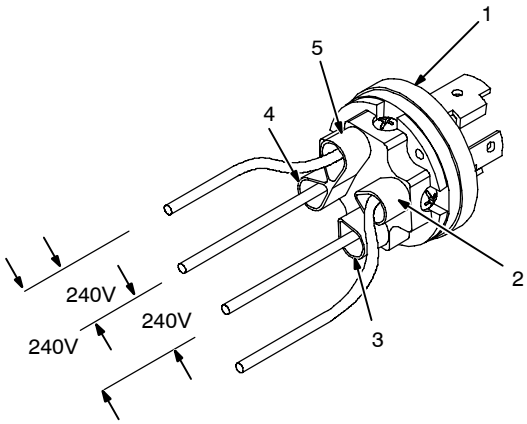
☞ *At least once a month, run engine at weld/power speed and press Test button to verify GFCI is working properly.*

Ref. ST-207 554-A

7-3. Wiring Instructions For Optional 240 Volt, 3-Phase Twistlock Plug (NEMA L15-30P)







1 240 V AC Three-Phase, 30 A, 3P4W Twistlock Plug

2 Load 1 (Brass) Terminal (X)

3 Load 2 (Brass)Terminal (Y)

4 Load 3 (Brass) Terminal (Z)

5 Ground (Green) Terminal (G)

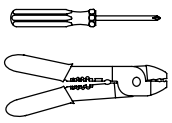
6 Cord Grip

Strip cord jacket back enough to separate conductors.

Strip conductors enough to make good contact with plug terminals. Make plug connections and reinstall cord grip.

Tighten cord grip assembly screws. Do not overtighten.

Tools Needed:



Plug2 7/99 – 802 437

7-4. Wiring Instructions For Optional 240 Volt, Single-Phase Plug (NEMA 14-50P)

Current Available in Amperes	
240 V Receptacle*	**Each 120 V Duplex Receptacle**
0	20
5	20
10	20
15	20
20	20
25	15
30	10
35	5
40	0
V x A = Watts	
*One 240 V load or two 120 V loads.	

7

The plug can be wired for a 240 V, 2-wire load or a 120/240V, 3-wire load. See circuit diagram.

1 Plug Wired for 120/240 V, 3-Wire Load

When wired for 120 V loads, each duplex receptacle shares a load with one half of 240 V receptacle.

2 Plug Wired for 240 V, 2-Wire Load

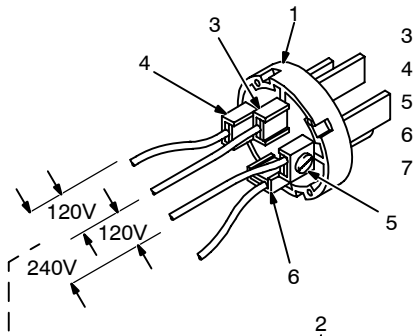
3 Neutral (Silver) Terminal

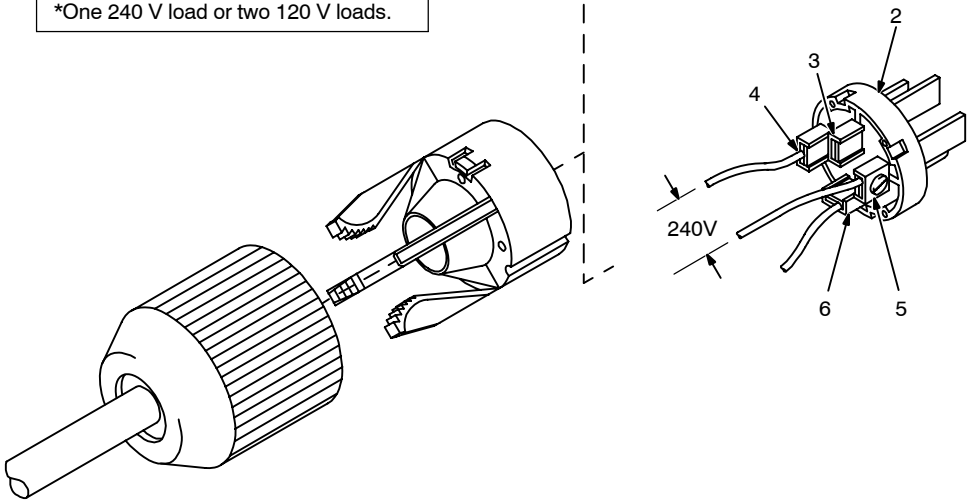
4 Load 1 (Brass)Terminal

5 Load 2 (Brass) Terminal

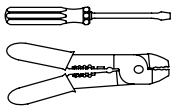
6 Ground (Green) Terminal

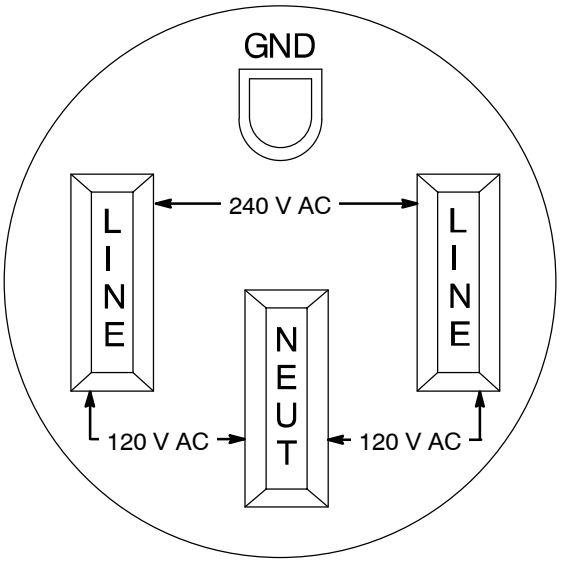
7 Amperes Available using 120/240 V Plug





Tools Needed:

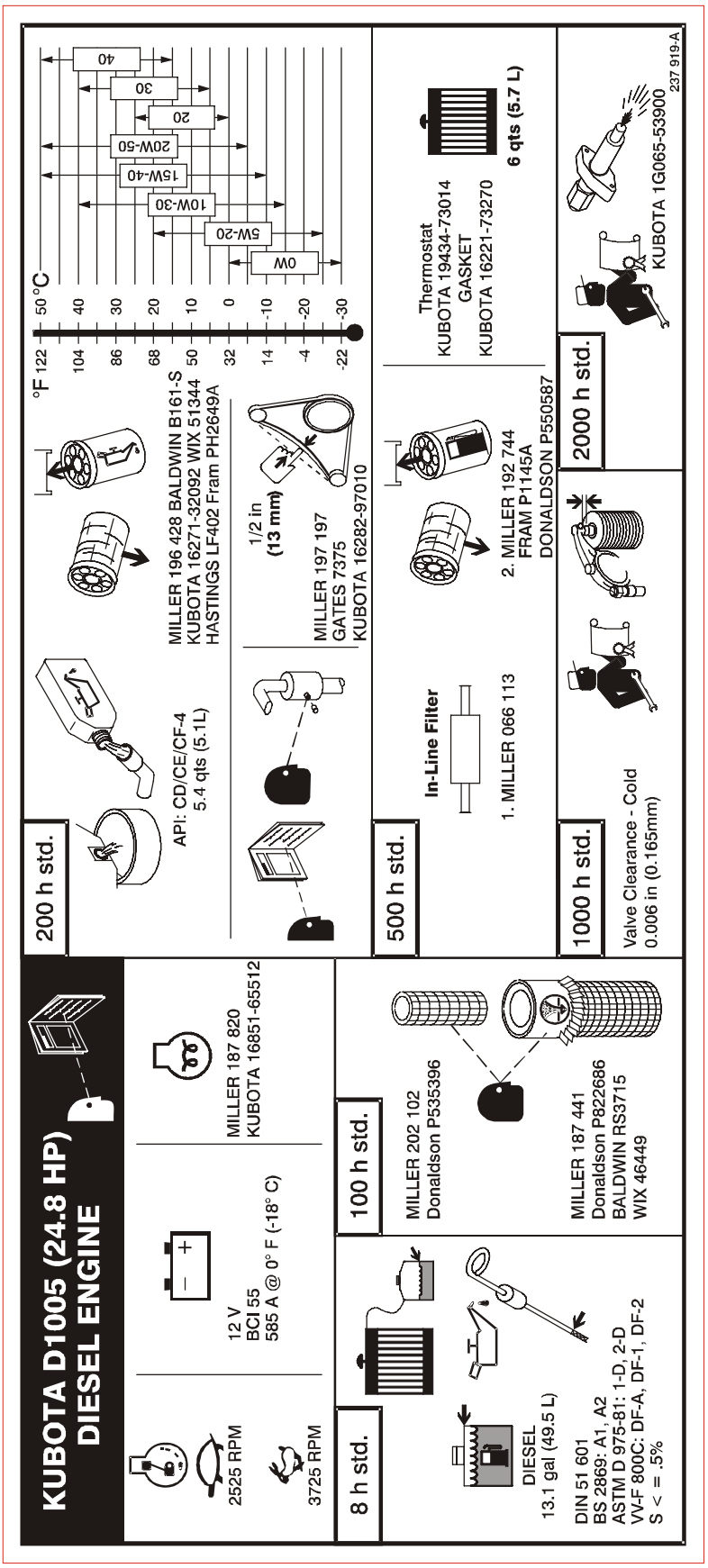




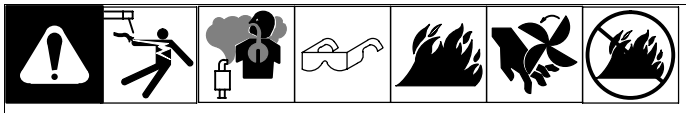
plug1 11/03 – 120 813-D

SECTION 8 – MAINTENANCE AND TROUBLESHOOTING

8-1. Maintenance Label



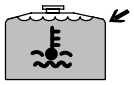
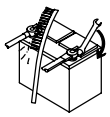
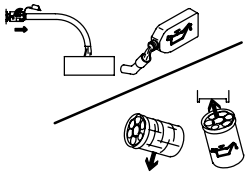
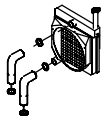
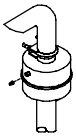
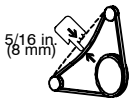
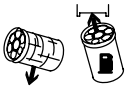
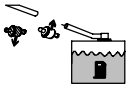
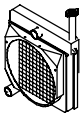
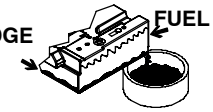
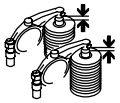
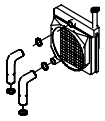
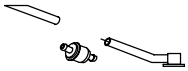
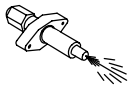
8-2. Routine Maintenance



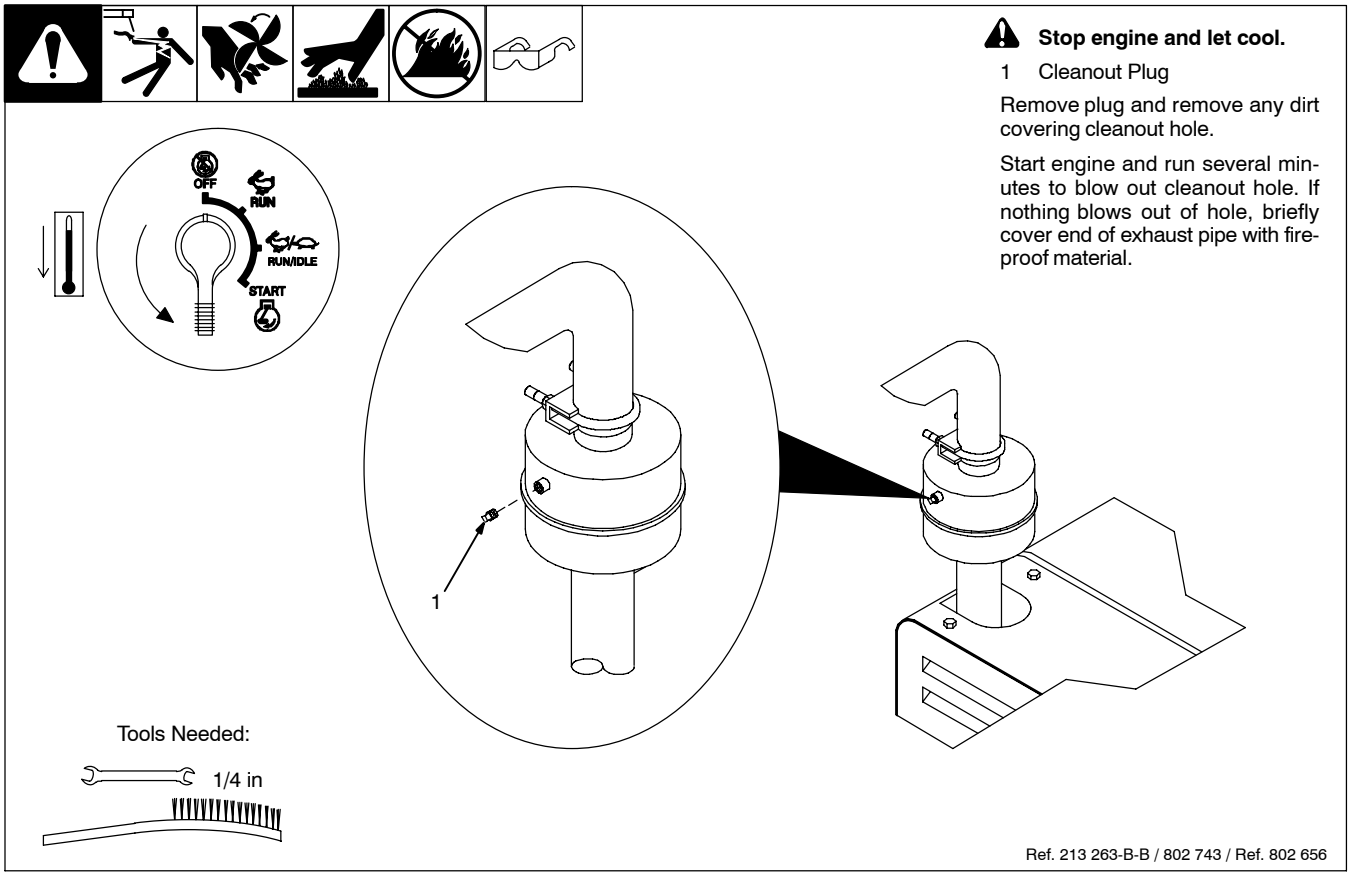
Recycle engine fluids.

Stop engine before maintaining.

☞ *See Engine Manual and Maintenance Label for important start-up, service, and storage information. Service engine more often if used in severe conditions.*

	✓ = Check ◇ = Change ◒ = Clean ☆ = Replace ***** To be done by Factory Authorized Service Agent				Reference
Every **8** Hours	 ✓ Coolant Level	 ✓ Fuel Level	 ✓ Oil Level	 ◒ Oil, Fuel Spills	Section 5-6
Every **100** Hours	 ◒ Air Cleaner Element	 ✓ Air Cleaner Hoses	 ◒ Weld Terminals	 ◒ Battery Terminals	Section 8-5, Engine Manual
Every **200** Hours	 ◇ Oil ◇ Oil Filter	***NOTICE*** *– Change engine oil and filter after initial 50 to 75 hours of use.*	 ✓ Radiator Hoses	 ☆ Unreadable Labels	Section 8-6, 8-7
	 ◒ Spark Arrestor Screen	 5/16 in. (8 mm) ✓ Belt Tension			
Every **500** Hours	 ◇ Secondary Fuel Filter	 ◇ Primary Fuel Filter	 ✓ Thermostat	 SLUDGE FUEL ✓◒ Drain Sludge	Section 8-6
Every **1000** Hours	 OR ◒ Inside Unit	 ✓◒ Slip Rings* ✓☆ Brushes*	 ✓ Valve Clearance*	 ✓☆ Weld Cables	
Every **2000** Hours	 ✓☆ Coolant And Hoses	 ☆ Fuel Lines And Clamps	 ◒ Injectors*		Section 8-7, Engine Manual
	◒ = Clean unit exterior, including stainless steel, frequently to prevent rust and corrosion.				

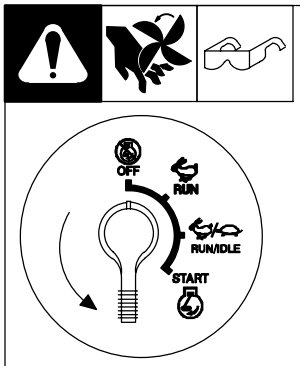
8-3. Servicing Spark Arrestor

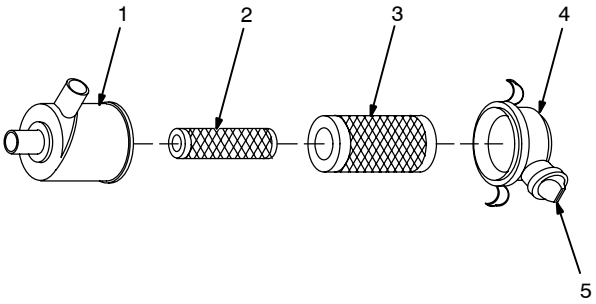

Stop engine and let cool.
1 Cleanout Plug
Remove plug and remove any dirt covering cleanout hole.
Start engine and run several minutes to blow out cleanout hole. If nothing blows out of hole, briefly cover end of exhaust pipe with fireproof material.
OFF
RUN
RUN/IDLE
START
1
Tools Needed:
1/4 in
Ref. 213 263-B-B / 802 743 / Ref. 802 656

8-4. Maintaining Stainless Steel (Models With Optional Package)

Stainless steel is very resistant to rust and corrosion; however, it must be kept clean to ensure rust and corrosion resistance. Units used in corrosive environments (chlorine or salt water environment for example) should be cleaned with mild soap and water frequently. If dirt build−up occurs, use a stainless steel cleaner to remove build−up. With proper maintenance, stainless steel maintains its luster and appearance.

8-5. Servicing Air Cleaner





Stop engine.

NOTICE *– Do not run engine without air cleaner or with dirty element. Engine damage caused by using a damaged element is not covered by the warranty.*

☞ *The air cleaner primary element can be cleaned but the dirt holding capacity of the filter is reduced with each cleaning. The chance of dirt reaching the clean side of the filter while cleaning and the possibility of filter damage makes cleaning a risk. Consider the risk of unwarrantable equipment damage when determining whether to clean or replace the primary element.*

If you decide to clean the primary element, we strongly recommend installing an optional safety element to provide additional engine protection. ***Never clean a safety element.*** *Replace the safety element after servicing the primary element three times.*

Clean or replace primary element if dirty (see note above before cleaning). **Replace** primary element if damaged. Replace primary element yearly or after six cleanings.

1 Housing

2 Safety Element (Optional)

3 Primary Element

4 Dust Cap

5 Dust Ejector

To clean air filter:

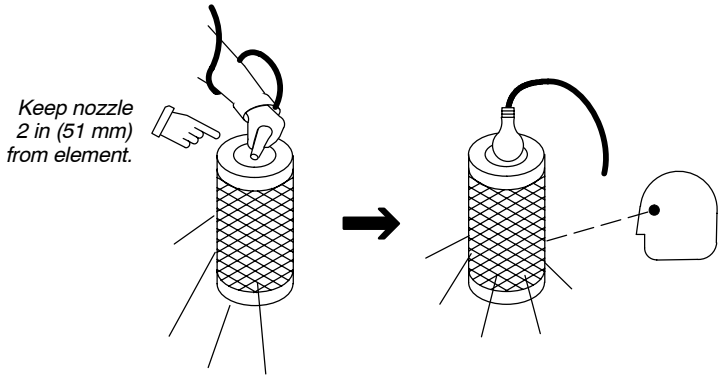
Wipe off cap and housing. Remove cap and dump out dust. Remove element(s). Wipe dust from inside cap and housing with damp cloth. Reinstall safety element (if present). Reinstall cap.

NOTICE *– Do not clean housing with air hose.*

Clean primary element with compressed air only.

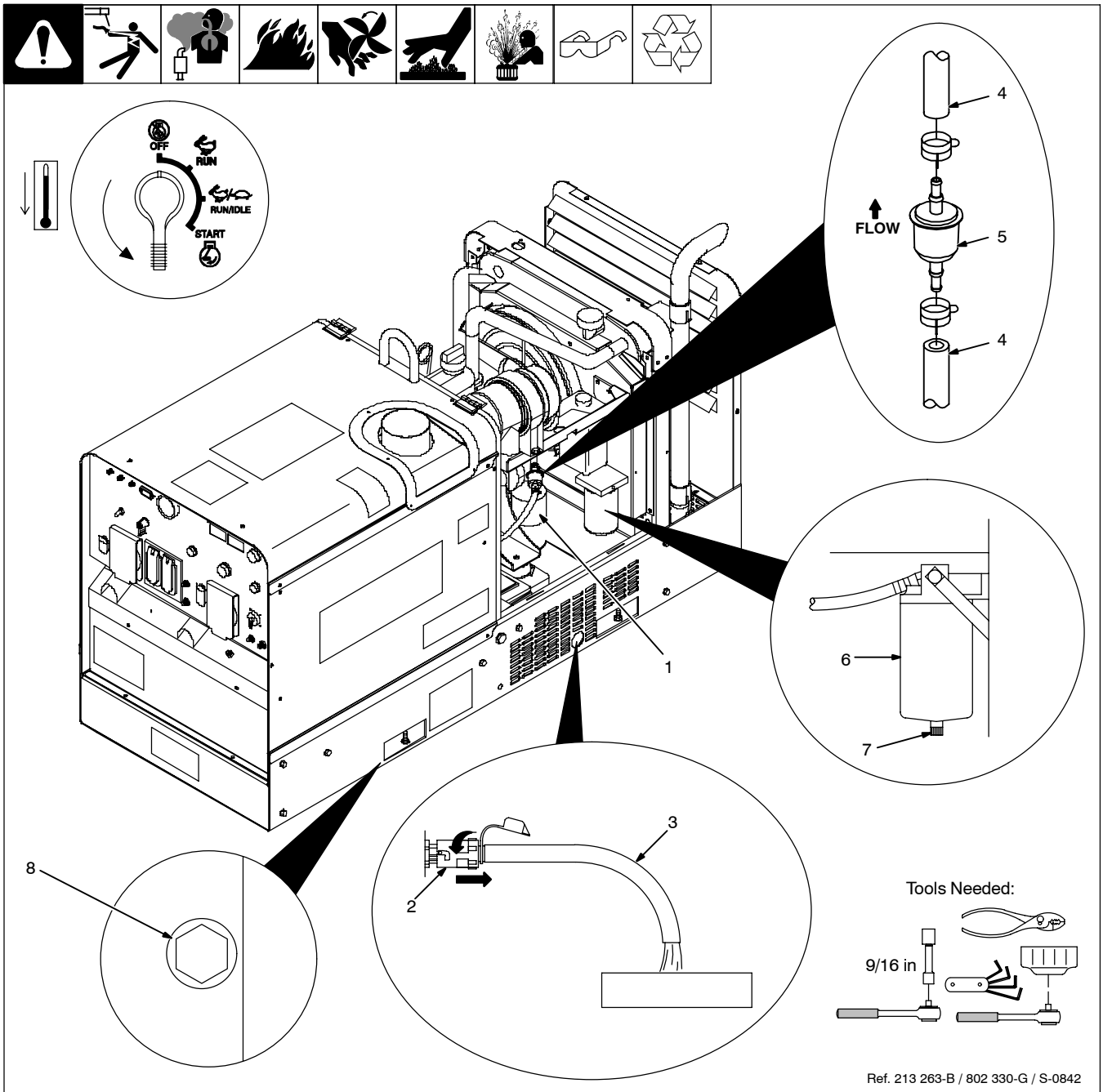
Air pressure must not exceed 100 psi (690 kPa). Use 1/8 in (3 mm) nozzle and keep nozzle at least 2 in (51 mm) from inside of element. Replace primary element if it has holes or damaged gaskets.

Reinstall primary element and cap (dust ejector down).



aircleaner1 9/00 – ST-153 929-B / ST-153 585 / Ref. S-0698-B

8-6. Servicing Engine Lubrication And Fuel Systems



Tools Needed:

Ref. 213 263-B / 802 330-G / S-0842

⚠ **Stop engine and let cool.**

1 Oil Filter
2 Oil Drain Valve
3 1/2 ID x 12 in Hose
4 Fuel Line
5 Primary Fuel Filter
6 Secondary Fuel Filter
7 Petcock
8 Fuel Tank Sludge Drain

To change oil and filter:

Pull oil drain hose through access hole in base. Change engine oil and filter according to instructions in engine manual.

NOTICE – *Close valve and valve cap before adding oil and running engine.*

Fill crankcase with new oil to full mark on dipstick (see Section 5-5).

To drain water from fuel system:

Open secondary fuel filter petcock and drain water into metal container. Close petcock when water-free fuel flows.

To change fuel filters:

Install new primary fuel filter as shown.

Replace secondary fuel filter according to engine manual.

Replace fuel lines if cracked or worn.

Wipe up any spilled fuel.

⚠ **After servicing, start engine and check for fuel leaks.**

Stop engine, tighten connections as necessary, and wipe up fuel.

To change coolant:

Change coolant according to engine manual.

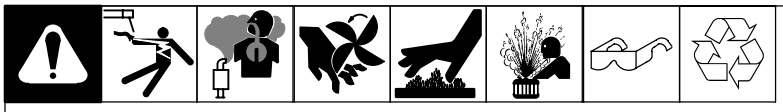
Run engine until engine reaches normal operating temperature. Loosen air bleed screw to remove air from cooling system. Tighten screw.

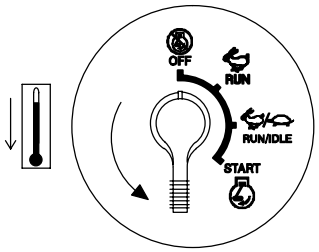
Check coolant level in recovery tank. Add coolant if necessary.

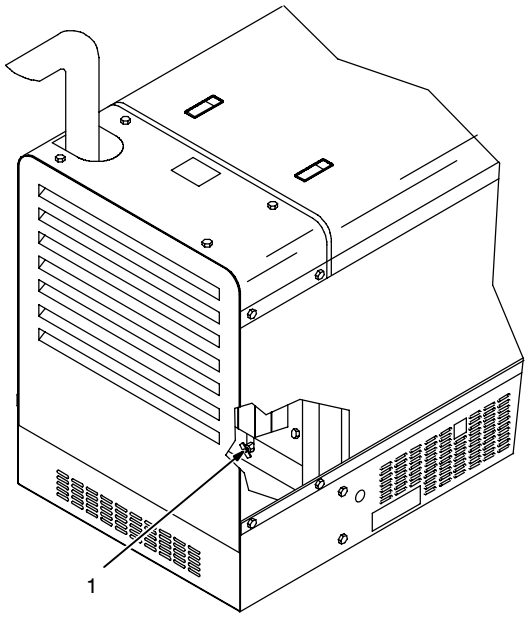
To drain sludge from fuel tank:

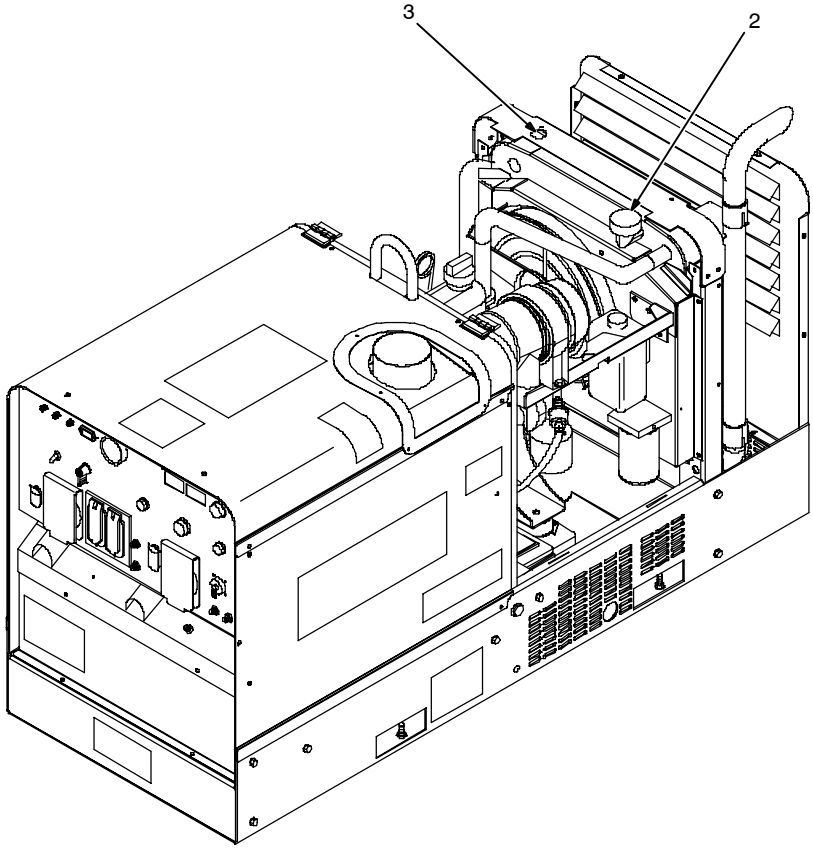
Put metal container under drain, and remove sludge drain plug. Reinstall plug when done.

8-7. Servicing Engine Cooling System









Stop engine and let cool.

1 Radiator Draincock

2 Radiator Cap

3 Radiator Air Bleed Screw

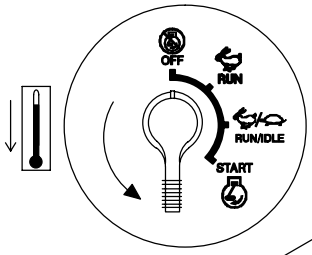
Change coolant according to engine manual. Add coolant according to Section 5-6).

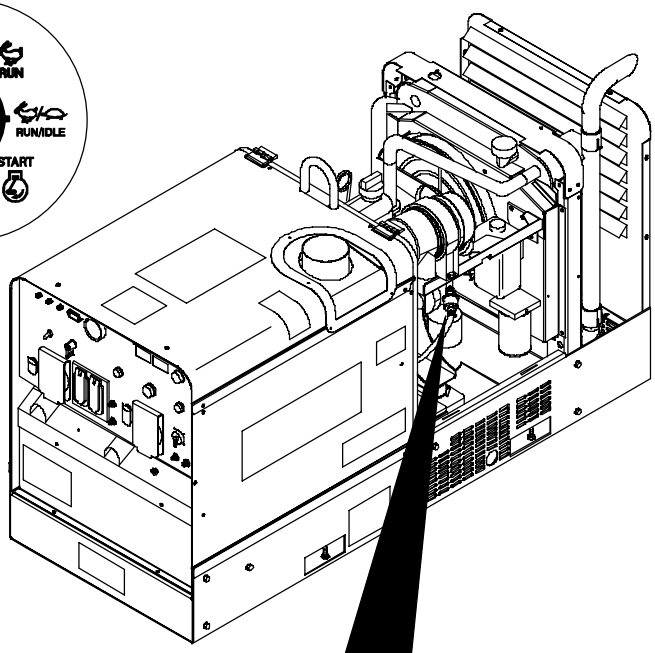
Run engine until engine reaches normal operating temperature. Loosen air bleed screw to remove air from cooling system. Tighten screw.

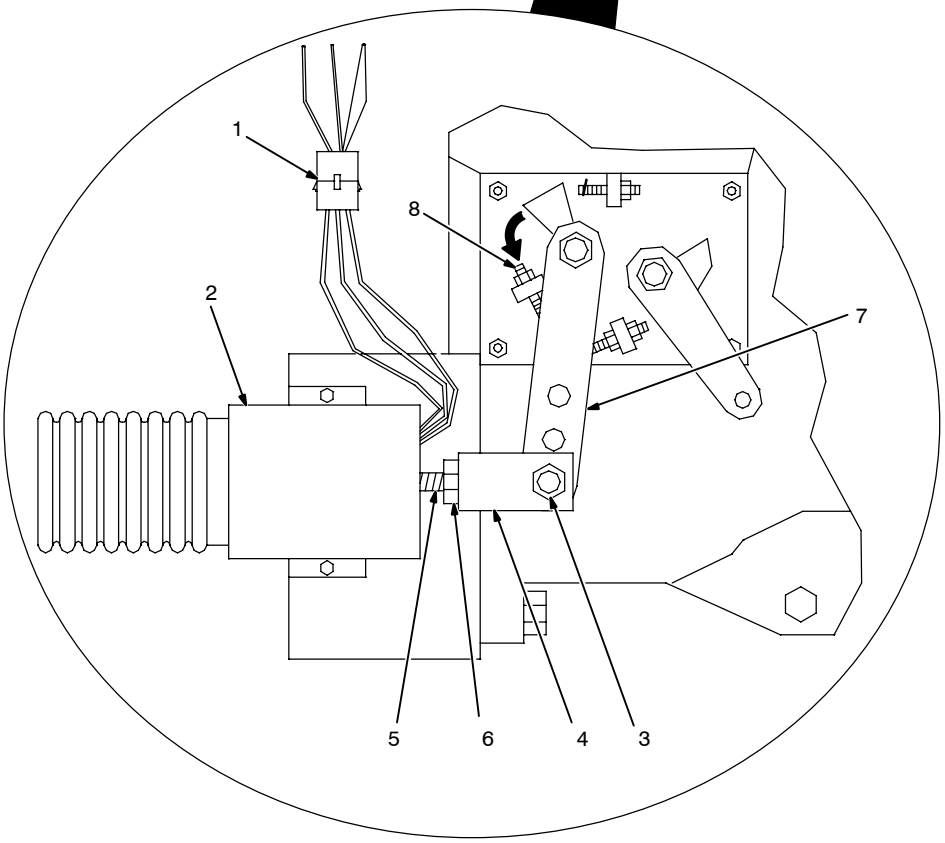
Check coolant level in recovery tank. Add coolant if necessary

802 330-G / 802 581

8-8. Replacing Throttle Solenoid TS1







Stop engine, and let cool.

Disconnect battery, negative (–) cable first.

Remove right side engine panel.

1 Plug PLG39/Receptacle RC39
2 Throttle Solenoid TS1
3 Shoulder Bolt And Nut
4 Throttle Link
5 Throttle Solenoid Plunger Rod
6 Jam Nut
7 Throttle Arm
8 Throttle Arm Stop Screw

Disconnect solenoid plug PLG39 from wiring harness receptacle RC39.

Remove shoulder bolt and nut from throttle link.

Remove solenoid from mounting bracket.

Note how much thread is visible on solenoid plunger rod. Loosen jam nut just enough so throttle link can be removed from solenoid rod.

Install throttle link on new solenoid plunger rod. Turn link until the same amount of thread will be visible on plunger rod when the jam nut is tightened. (Do not tighten jam nut yet.)

Mount solenoid on bracket. Move solenoid plunger manually to align slot in throttle link with hole in throttle arm. Insert shoulder bolt through slot/hole and secure with nut.

☞ *Be sure solenoid plunger rod pulls all the way in "bottoms" when energized. If plunger rod does not pull all the way in, readjust throttle link.*

☞ *Throttle arm should not contact stop screw when solenoid is energized. If necessary, adjust stop screw to create gap between throttle arm and stop screw.*

Tighten jam nut on solenoid plunger rod. Verify all other hardware is tight.

Connect solenoid plug PLG39 to wiring harness receptacle RC39.

Reconnect battery, negative (–) lead last.

Check engine speeds and adjust if necessary according to Section 8-9.

Reinstall side panel.

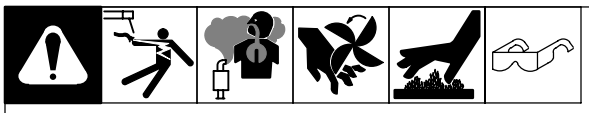
Tools Needed:

7/16, 3/8, 1/2 in
10 mm

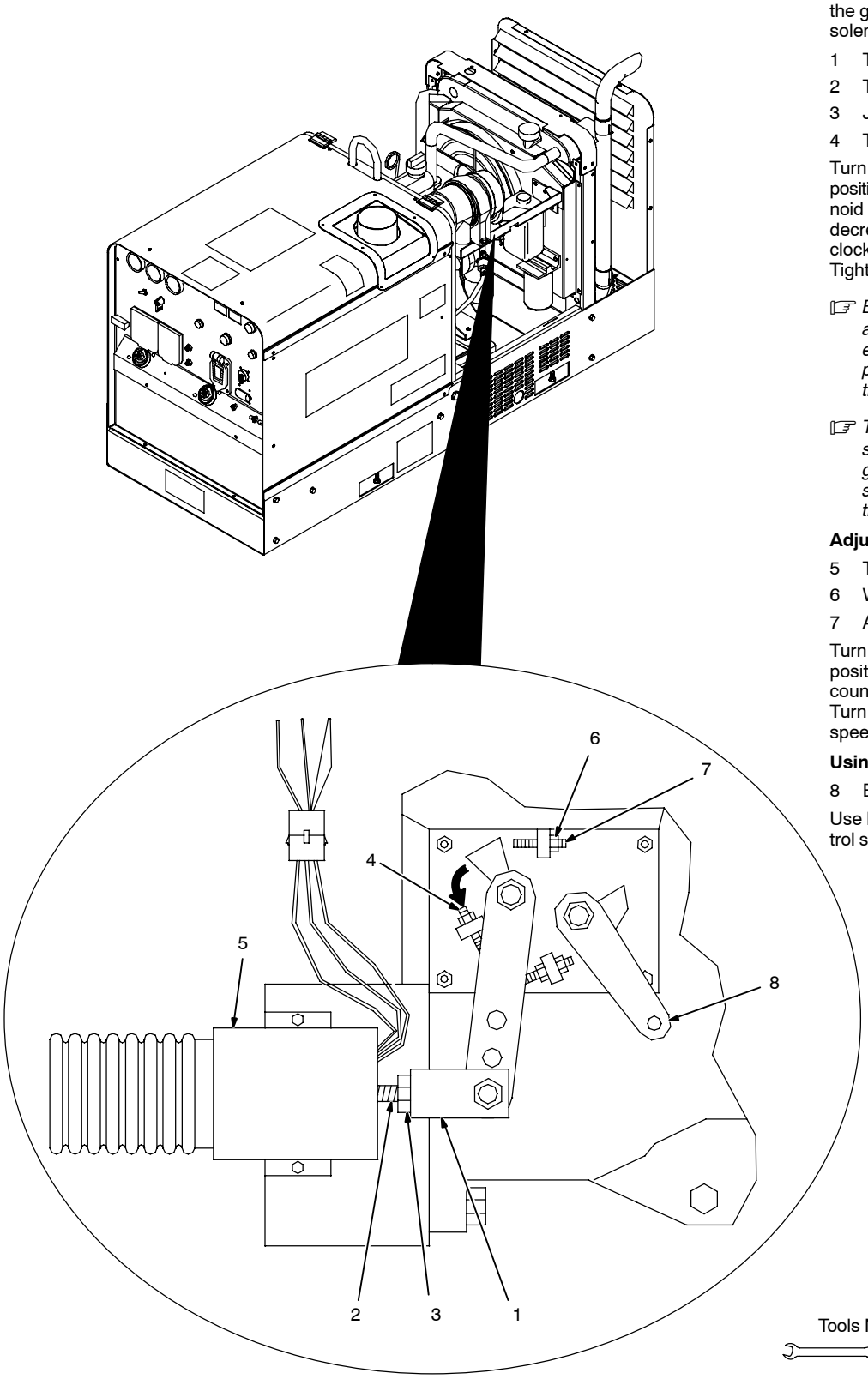
3/16 in

802 330-B

8-9. Adjusting Engine Speed



	2500 rpm (41.6 Hz)
	3750 Max (62.5 Hz)



After tuning engine, check engine speeds with a tachometer (see table). If necessary, adjust speeds as follows:

Start engine and run until warm. Turn V/A control to max.

Adjusting Idle Speed

Idle speed is factory set and normally does not not require adjustment unless the governor/injector pump or throttle solenoid is replaced.

1 Throttle Link
2 Throttle Solenoid Plunger Rod
3 Jam Nut
4 Throttle Arm Stop Screw

Turn Engine Control switch to Run/Idle position. Loosen jam nut and turn solenoid rod clockwise (into throttle link) to decrease idle speed. Turn rod counterclockwise to increase idle speed. Tighten nut.

☞ *Be sure solenoid plunger rod pulls all the way in "bottoms" when energized. If plunger rod does not pull all the way in, readjust rod and throttle link.*

☞ *Throttle arm should not contact stop screw when solenoid is energized. If necessary, adjust stop screw to create gap between throttle arm and stop screw.*

Adjusting Weld/Power Speed

5 Throttle Solenoid
6 Weld Speed Jam Nut
7 Adjustment Screw

Turn Engine Control switch to Run position. Loosen nut and turn screw counterclockwise to increase speed. Turn screw clockwise to decrease speed. Tighten nut.

Using Engine Stop Lever

8 Engine Stop Lever

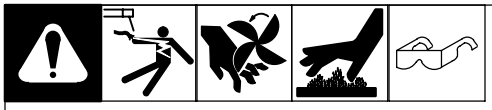
Use lever to stop engine if Engine Control switch does not work.

Tools Needed:

10 mm

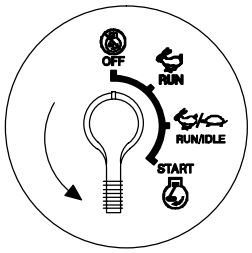
802 330-B

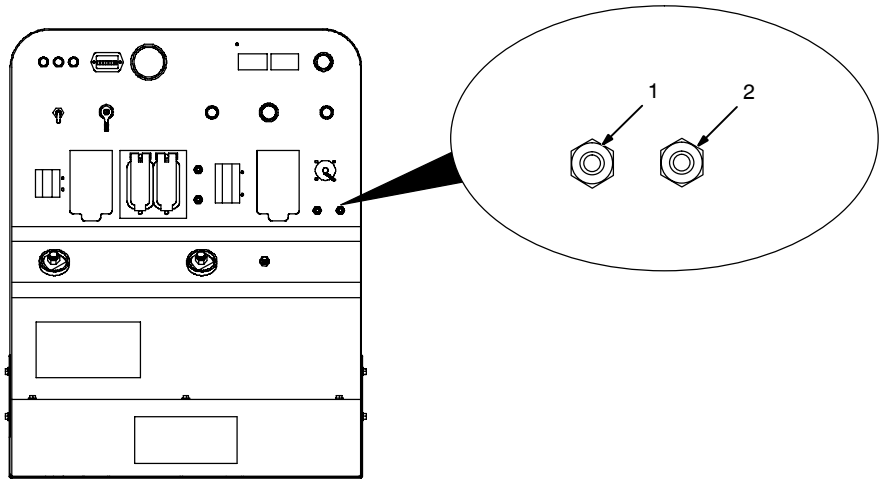
8-10. Overload Protection

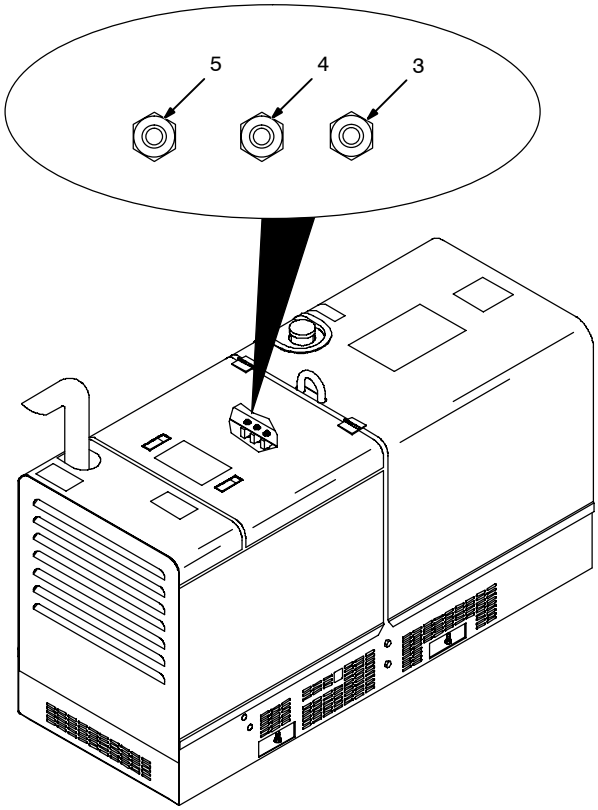


Tools Needed:

3/8 in







Stop engine.

☞ *When a supplementary protector or circuit breaker opens, it usually indicates a more serious problem exists. Contact Factory Authorized Service Agent.*

1 Supplementary Protector CB5

CB5 protects the 115 volt ac output to Remote 14 receptacle RC14. If CB5 opens, 115 volt ac output to RC14 stops.

2 Supplementary Protector CB6

CB6 protects the 24 volt ac output to Remote 14 receptacle RC14. If CB6 opens, 24 volt ac output to RC14 stops.

Press button to reset.

3 Circuit Breaker CB7

4 Circuit Breaker CB8

5 Supplementary Protector CB10

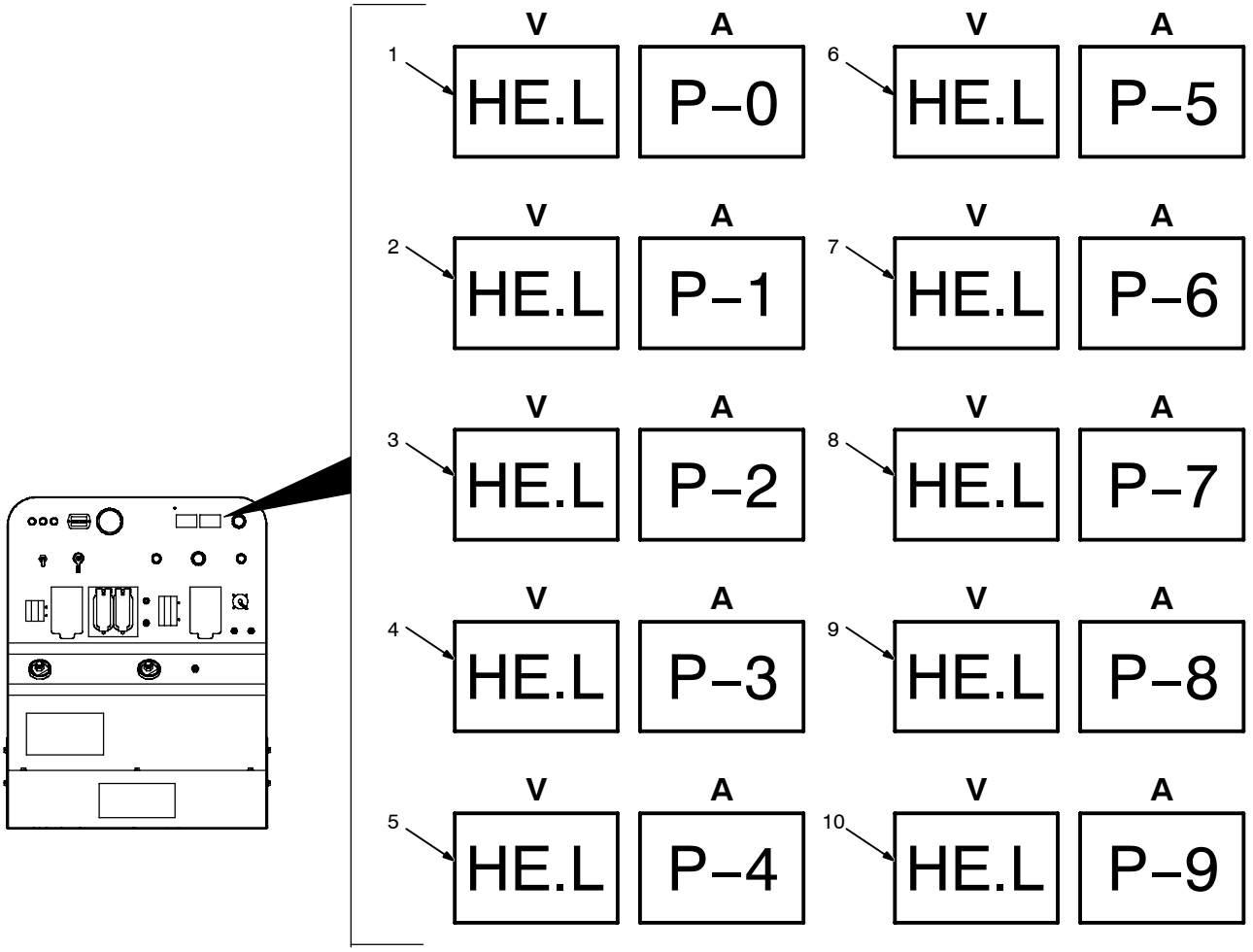
CB7 protects the engine glow plug from overload. If CB7 opens, the glow plug does not work and engine may not start in cold weather. Check continuity and connections of engine glow plug.

CB8 protects the engine wiring system from overload. If CB8 opens, the engine will not crank. Check battery, starter, and engine control switch.

CB10 protects the engine fuel solenoid from overload. If CB10 opens, the engine cranks but does not start. Check fuel solenoid FS1 for obstructions.

Ref. 213 263-B-B / 802 174-E / 802 175-D

8-11. Voltmeter/Ammeter Help Displays



802 174-G

Use the voltmeter/ammeter help displays to help determine the cause of no weld output. When a help display is shown, the inverter module weld output has stopped but the engine continues to run. Correct the problem before resuming operation.

The display screen resets when the fault is corrected.

☞ *All directions are in reference to the front of the unit. All circuitry referred to is located inside the inverter module.*

1 Help 0 Display

Indicates a shorted thermistor RT2 on the left side of the unit. If this display is shown, contact a Factory Authorized Service Agent.

2 Help 1 Display

Indicates a malfunction in the primary power circuit possibly caused by applying a high weld load at idle speed. Turn Engine Control switch to Run position. If problem continues, contact a Factory Authorized Service Agent.

3 Help 2 Display

Indicates a malfunction in the thermal protection circuitry located on the left side of the unit. If this display is shown, contact a Factory Authorized Service Agent.

4 Help 3 Display

Indicates the left side of the unit has overheated. The unit has shut down to allow the fan to cool it (see Section 4-3). Operation will continue when the unit has cooled.

5 Help 4 Display

Indicates a malfunction in the thermal protection circuitry located on the right side of the unit. If this display is shown, contact a Factory Authorized Service Agent.

6 Help 5 Display

Indicates the right side of the unit has overheated. The unit has shut down to allow the fan to cool it (see Section 4-3). Operation will continue when the unit has cooled.

7 Help 6 Display

Indicates that the input voltage is too low and the unit has automatically shut down. Operation will continue when the voltage is within the acceptable lower range limit (15% below the applicable input voltage). If this display is shown, have a Factory Authorized Service Agent check the power generator output voltage.

8 Help 7 Display

Indicates that the input voltage is too high and the unit has automatically shut down. Operation will continue when the voltage is within the acceptable upper range limit (15% above the applicable input voltage). If this display is shown, have a Factory Authorized Service Agent check the power generator output voltage.

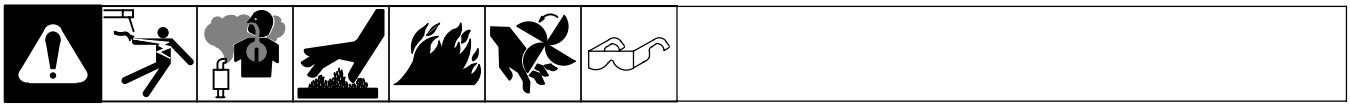
9 Help 8 Display

Indicates a malfunction in the secondary power circuit of the unit. If this display is shown, contact a Factory Authorized Service Agent.

10 Help 9 Display

Indicates a shorted thermistor RT1 on the right side of the unit. If this display is shown, contact a Factory Authorized Service Agent.

8-12. Troubleshooting



A. Welding

Trouble	Remedy
No weld output.	Check control settings.
	Check weld connections.
	Disconnect equipment from generator power receptacles during start-up.
	If using remote control, be sure mode switch is in a position that provides output control at Remote 14 receptacle (see Sections 5-11 and 6-1).
	Check, repair, or replace remote control.
	Unit overheated. Allow unit to run so fan cools unit (see Section 4-3).
	Have Factory Authorized Service Agent check brushes, slip rings, power board PC7, voltage regulator board PC8, interconnecting board PC2, and control board PC1.
Ammeter and voltmeter do not work after unit has run out of fuel.	Restart the engine.
Low weld output.	Check control settings.
	Place V/A Control switch in Panel position, or move switch to Remote position and connect remote amperage/voltage control to Remote 14 receptacle RC14 (see Section 5-11).
	Check and clean air cleaner as necessary (see Section 8-5).
	Check engine speed, and adjust if necessary (see Section 8-9).
	If using remote control, be sure mode switch is in a position that provides output control at Remote 14 receptacle RC14 (see Sections 5-11 and 6-1).
	Have Factory Authorized Service Agent check brushes, slip rings, voltage regulator board PC8, interconnecting board PC2, and control board PC1.
	See engine manual.
High weld output.	Check control settings.
	Check engine speed, and adjust if necessary (see Section 8-9).
	Check for obstructed movement of throttle solenoid linkage.
	Have Factory Authorized Service Agent check voltage regulator board PC8 and control board PC1.
Weld output cannot be adjusted.	Check position of V/A Control switch (see Section 6-1).
	Have Factory Authorized Service Agent check voltage regulator board PC8 and control board PC1.
Erratic weld output.	Check control settings.
	Clean and tighten connections both inside and outside unit.
	Check and secure lead connections to A/V control.
	Be sure connection to work piece is clean and tight.
	Remove excessive coils from weld cables.
	Use dry, properly stored electrodes.
	Check engine speed, and adjust if necessary (see Section 8-9).
	Have Factory Authorized Service Agent check brushes, slip rings, voltage regulator board PC8, interconnecting board PC2, and control board PC1.

Trouble	Remedy
Remote contactor control does not activate contactor.	Check and tighten connections to Remote 14 receptacle RC14 (see Section 5-11).
Lack of high frequency; difficulty in establishing Gas Tungsten Arc Welding arc.	Use proper size tungsten for welding amperage.
	Reduce leakage of high frequency from torch or work cable (check grounding, remove excessive coils from weld cables, use shorter weld cables, etc.).
	Check cables and torch for cracked or deteriorated insulation or bad connections. Repair or replace necessary parts.
Wandering arc – poor control of arc direction.	Reduce gas flow rate.
	Select proper size tungsten. Properly prepare tungsten.
Tungsten electrode oxidizing and not remaining bright after conclusion of weld.	Shield weld zone from drafts.
	Increase postflow time.
	Check and tighten all gas fittings.
	Properly prepare tungsten.
No 115 volt ac output at Remote 14 receptacle RC14.	Reset supplementary protector CB5 (see Section 8-10).
No 24 volt ac output at Remote 14 receptacle RC14.	Reset supplementary protector CB6 (see Section 8-10).

B. Generator Power

Trouble	Remedy
No power output.	Reset supplementary protectors (see Section 7-1).
	Have Factory Authorized Service Agent check brushes, slip rings, power board PC7, voltage regulator board PC8, interconnecting board PC2, and control board PC1.
Low power output.	Check air cleaner, and clean or replace element if necessary.
	Check engine speed, and adjust if necessary (see Section 8-9).
	See engine manual.
High power output.	Check engine speed, and adjust if necessary (see Section 8-9).
Erratic power output.	Check receptacle wiring and connections.
	Check governor according to engine manual.
	Have Factory Authorized Service Agent check brushes, slip rings, power board PC7, voltage regulator board PC8, interconnecting board PC2, and control board PC1.

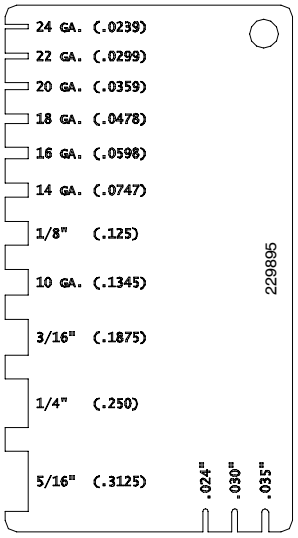
C. Engine

Trouble	Remedy
Engine will not crank.	Reset circuit breaker CB8 (see Section 8-10).
	Check battery voltage.
	Check battery connections and tighten if necessary.
	Have Factory Authorized Service Agent check Engine Control switch S2.
Engine cranks, but does not start.	Check fuel level (see Section 5-5).
	Open fuel valve (see Section 5-5).
	Check oil level (see Section 5-5). Engine will not start if oil pressure is low.
	Reset supplementary protector CB10 (see Section 8-10).
	Check coolant level and fan belt (see Section 5-5 and engine manual). Engine will not start if coolant temperature is high.
	Use Glow Plug switch if unit does not start in cold weather. If unit still does not start, reset circuit breaker CB7 (see Section 8-10).
	Service primary and secondary fuel filters (see Section 8-6).
	Check battery and replace if necessary.
	Check engine charging system according to engine manual.
	Bleed air from fuel system according to engine manual.
	Reset customer-supplied emergency air shutdown valve (if equipped) (see Section 5-12).
	Have Factory Authorized Service Agent check low oil pressure switch S5, engine coolant temperature switch S4, and control relay CR1.
	See engine manual.
Engine starts, but stops when Engine Control switch returns to Run position.	Check oil level (see Section 5-5). Engine will not start if oil pressure is too low.
	Check coolant level and fan belt (see Section 5-5 and engine manual). Engine will not start if engine temperature is too high.
	Check and refill crankcase with proper viscosity oil for operating temperature, if necessary (see engine manual).
	Have Factory Authorized Service Agent check low oil pressure switch S5, engine coolant temperature switch S4, Engine Control switch S2, control relay CR1, and voltage regulator board PC8.
Engine does not stop.	Stop engine by pushing down engine stop lever (see Section 5-5) or closing fuel valve (see Section 5-5). After stopping engine, adjust fuel solenoid linkage (see engine manual).
Engine stopped during normal operation.	Check fuel level (see Section 5-5).
	Open fuel valve (see Section 5-5).
	Check oil level (see Section 5-5). Engine stops if oil pressure is too low.
	Check coolant level and fan belt (see Section 5-5 and engine manual). Engine stops if engine temperature is too high.
	Bleed air from fuel system according to engine manual.
	Have Factory Authorized Service Agent check low oil pressure switch S5 and engine coolant temperature switch S4.
Battery discharges between uses.	Clean top of battery with baking soda and water solution; rinse with clear water.
	Periodically recharge battery (approximately every 3 months).
	Replace battery.
	Check voltage regulator according to engine manual.

Trouble	Remedy
Engine does not go to low (idle) speed with Engine Control switch in Run/Idle position.	Be sure Engine Control switch S2 is in Run/Idle position.
	Remove all weld and generator power loads.
	Turn off remote device connected to Remote 14 receptacle RC14 (see Section 5-11).
	Check for obstructed movement of throttle solenoid linkage.
	Have Factory Authorized Service Agent check voltage regulator board PC8 and current transformer CT1.
Engine does not go to high (run) speed when generator power or large weld load is applied with Engine Control switch in Run/Idle position.	Place Engine Control switch in the Run position. Have Factory Authorized Service Agent check unit.
Engine uses oil during run-in period; wetstacking occurs.	Dry engine (see Section 10 and engine manual).
Coolant recovery tank continuously overflows.	Bleed air from radiator, and replace lost coolant (see Section 5-6).

Notes

Notes



MATERIAL THICKNESS GAUGE

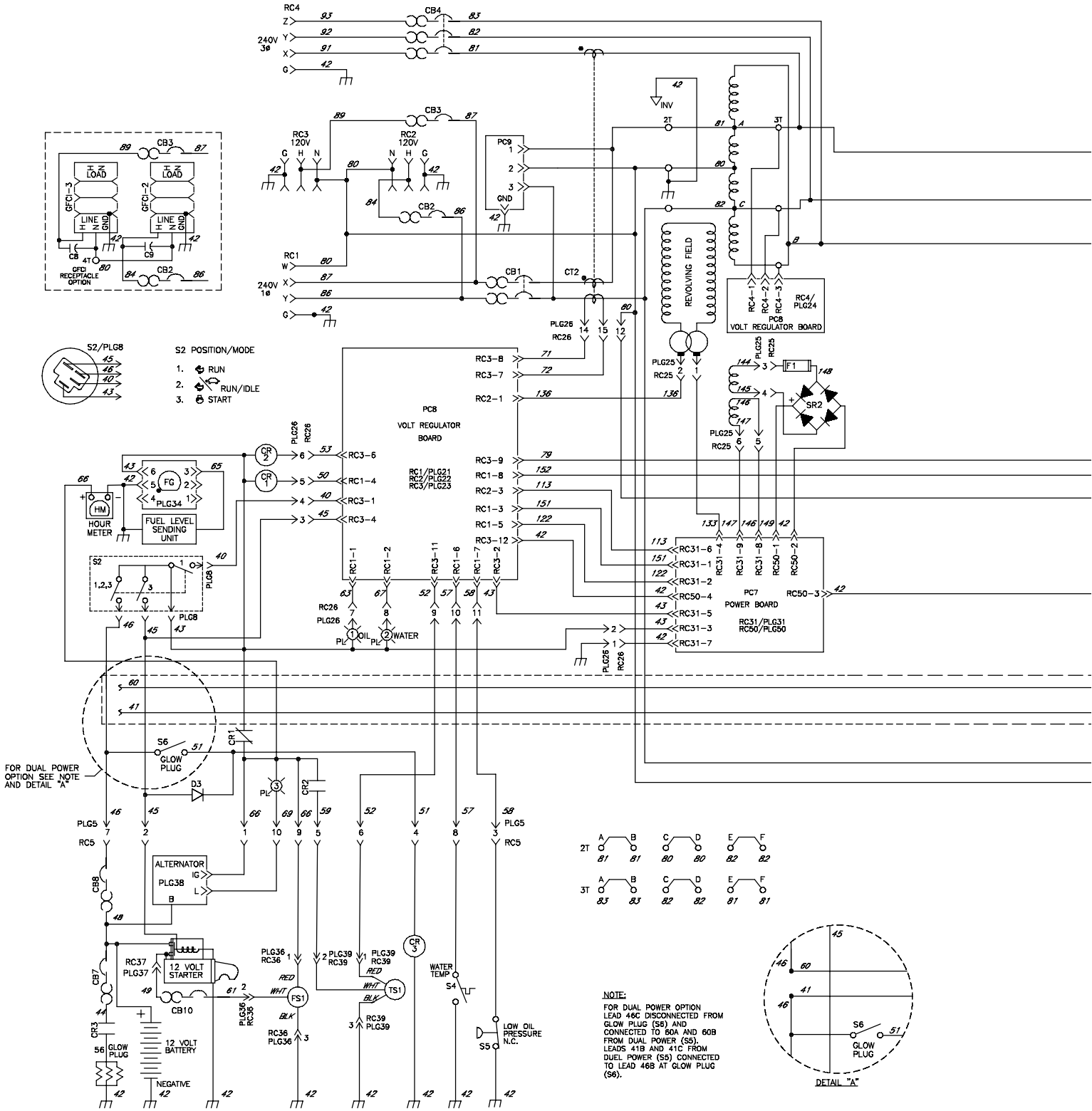
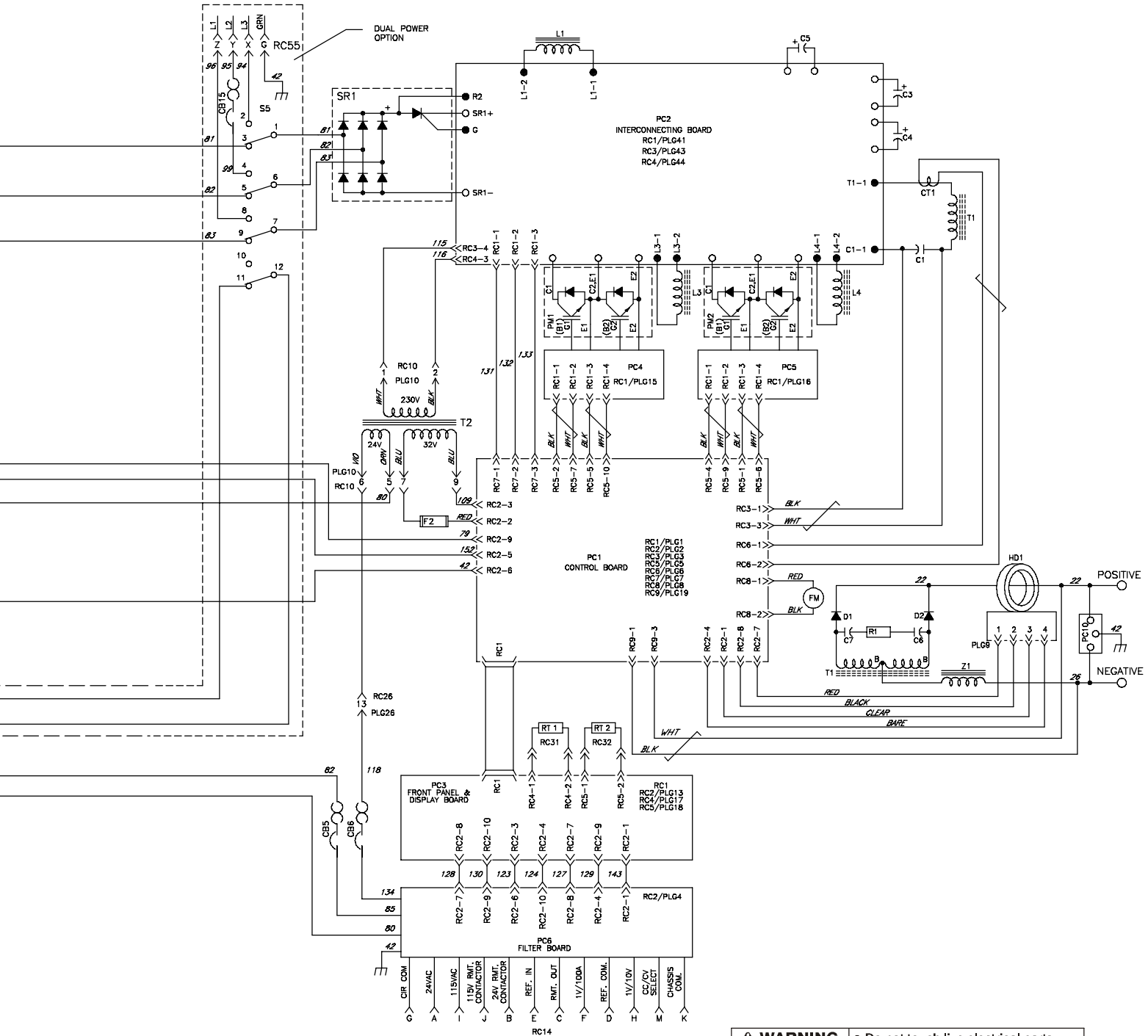


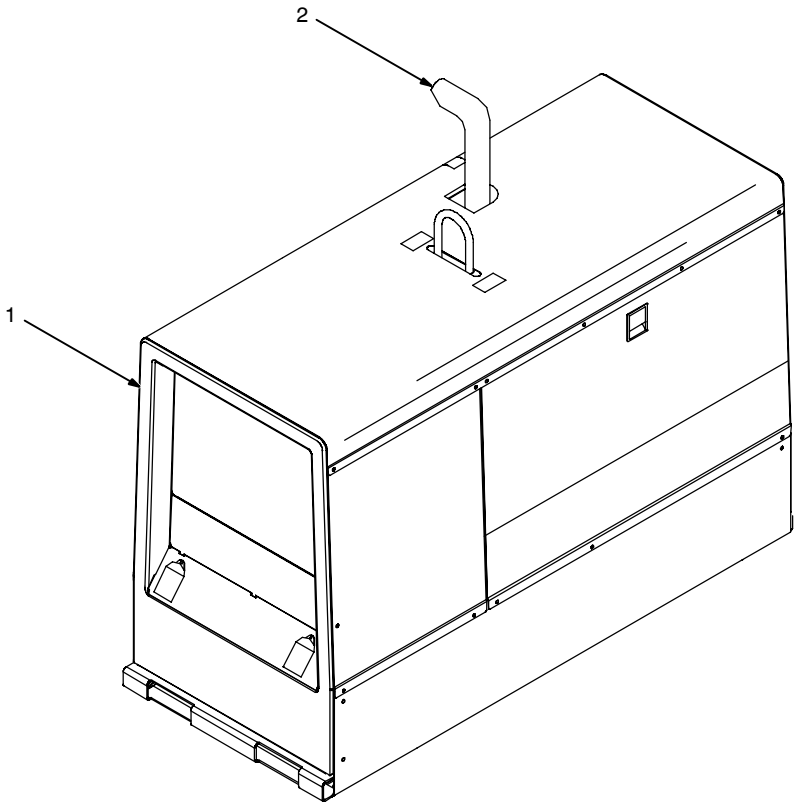
Figure 9-1. Circuit Diagram For Welding Generator



⚠ WARNING	• Do not touch live electrical parts. • Disconnect input power or stop engine before servicing. • Do not operate with covers removed. • Have only qualified persons install, use, or service this unit.
ELECTRIC SHOCK HAZARD	

SECTION 10 – RUN-IN PROCEDURE

10-1. Wetstacking



⚠ **Do not perform run-in procedure at less than 20 volts weld output and do not exceed duty cycle or equipment damage may occur.**

1 Welding Generator

Run diesel engines near rated voltage and current during run-in period to properly seat piston rings and prevent wetstacking. See nameplate, rating label, or specifications section in this manual to find rated voltage and current.

☞ *Do not idle engine longer than necessary. Piston rings seat faster if engine runs at weld/power rpm, and the welding generator is kept loaded during run-in.*

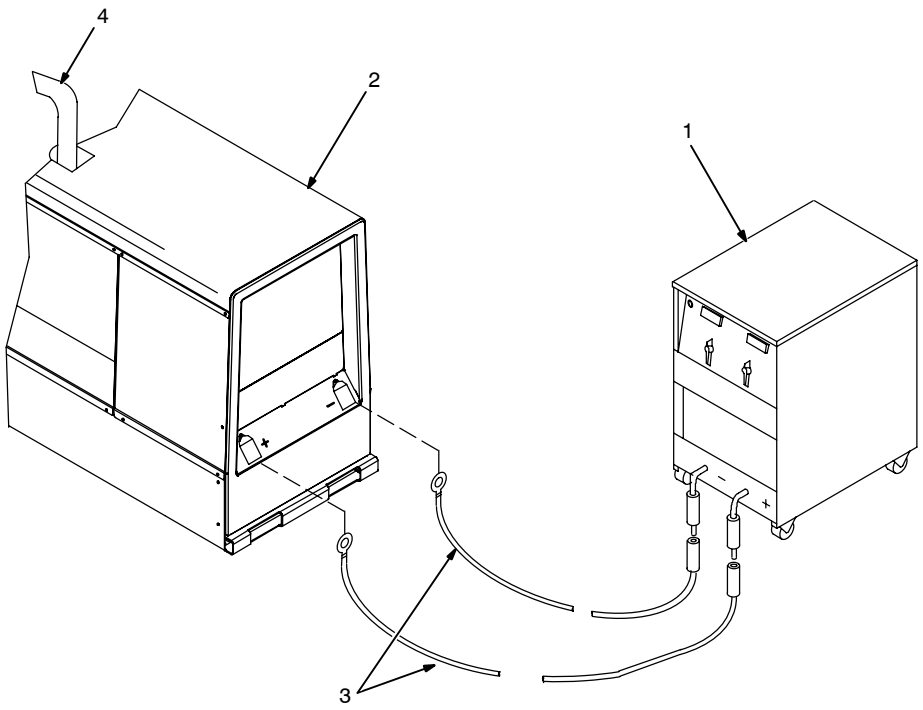
2 Engine Exhaust Pipe

Wetstacking is unburned fuel and oil in the exhaust pipe and occurs during run-in if the engine is run too long at light load or idle rpm.

If exhaust pipe is coated with a wet, black, tar-like substance, dry the engine using one of the following run-in procedures.

See the engine manual for additional engine run-in information.

10-2. Run-In Procedure Using Load Bank



Stop engine.

Do not touch hot exhaust pipe, engine parts, or load bank/grid.

Keep exhaust and pipe away from flammables.

NOTICE *– Do not perform run-in procedure at less than 20 volts weld output and do not exceed duty cycle or equipment damage may occur.*

1 Load Bank

Turn all load bank switches Off. If needed, connect load bank to 115 volts ac wall receptacle or generator auxiliary power receptacle.

2 Welding Generator

3 Weld Cables

Connect load bank to generator weld output terminals using proper size weld cables with correct connectors. Observe correct polarity.

Start engine and run for several minutes.

Set load bank switches and then adjust generator V/A control so load equals 225 amps at 30 volts.

Check generator and load bank meters after first five minutes then every fifteen minutes to be sure generator is loaded properly.

☞ *Check oil level frequently during run-in; add oil if needed.*

It is recommended to run the welding generator for two hours minimum and up to four hours under load. Place V/A control in minimum position, then turn off load bank to remove load. Run engine several minutes at no load.

Stop engine and let cool.

4 Engine Exhaust Pipe

Repeat procedure if wetstacking is present.

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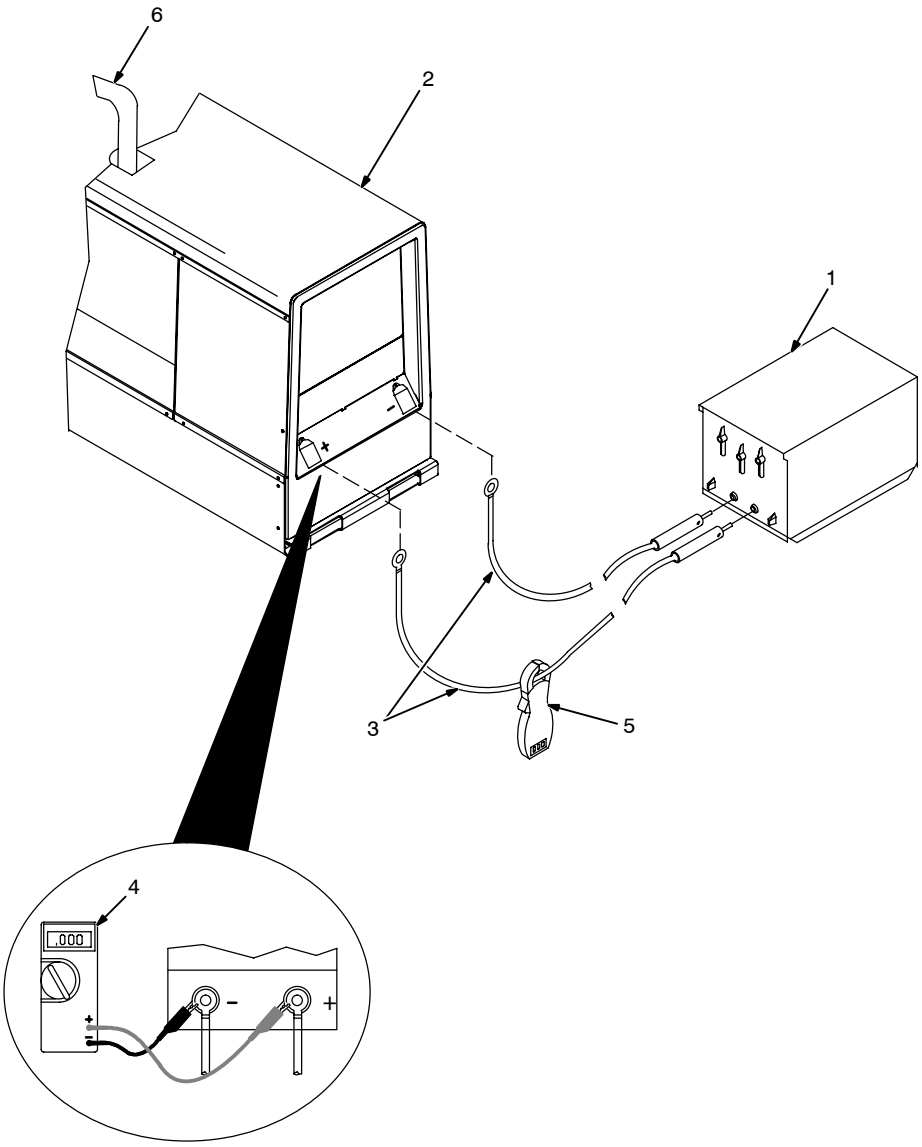
10-3. Run-In Procedure Using Resistance Grid



Stop engine.

Do not touch hot exhaust pipe, engine parts, or load bank/grid.

Keep exhaust and pipe away from flammables.

NOTICE *– Do not perform run-in procedure at less than 20 volts weld output and do not exceed duty cycle or equipment damage may occur.*

1 Resistance Grid

Use grid sized for generator rated output.

Turn Off grid.

2 Welding Generator

3 Weld Cables

Connect grid to generator weld output terminals using proper size weld cables with correct connectors (polarity is not important).

4 Voltmeter

5 Clamp-On Ammeter

Connect voltmeter and ammeter as shown, if not provided on generator.

Start engine and run for several minutes.

Set grid switches and then adjust generator V/A control so load equals 225 amps at 30 volts.

Check generator and meters after first five minutes then every fifteen minutes to be sure generator is loaded properly.

☞ *Check oil level frequently during run-in; add oil if needed.*

It is recommended to run the welding generator for two hours minimum and up to four hours under load. Place V/A control in minimum position, then shut down grid to remove load. Run engine several minutes at no load.

Stop engine and let cool.

6 Engine Exhaust Pipe

Repeat procedure if wetstacking is present.

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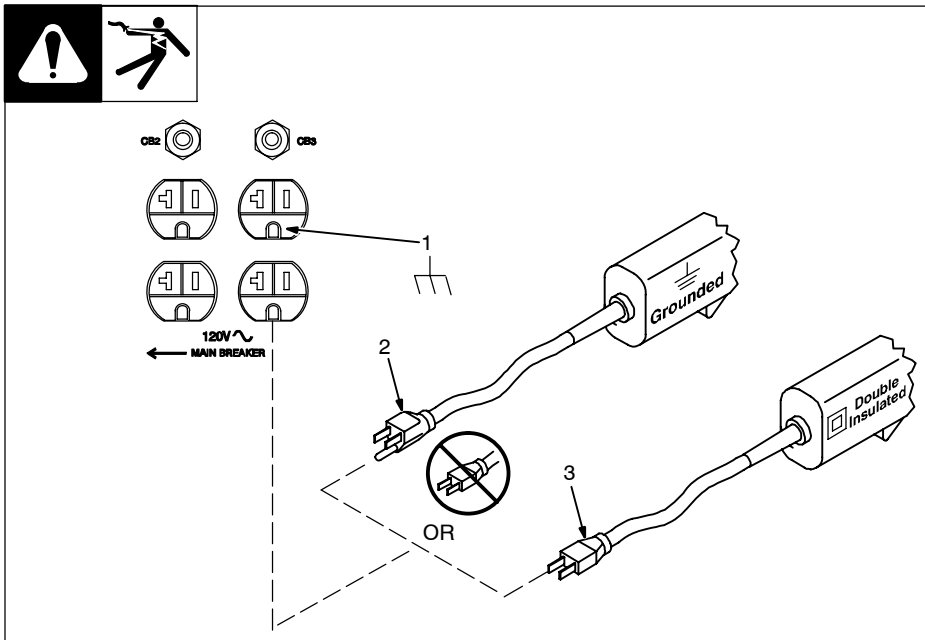
SECTION 11 – GENERATOR POWER GUIDELINES

☞ *The views in this section are intended to be representative of all engine-driven welding generators. Your unit may differ from those shown.*

11-1. Selecting Equipment



1 Generator Power Receptacles – Neutral Bonded To Frame

2 3-Prong Plug From Case Grounded Equipment

3 2-Prong Plug From Double Insulated Equipment

☞ *Be sure equipment has double insulated symbol and/or wording on it.*

⚠ **Do not use 2-prong plug unless equipment is double insulated.**

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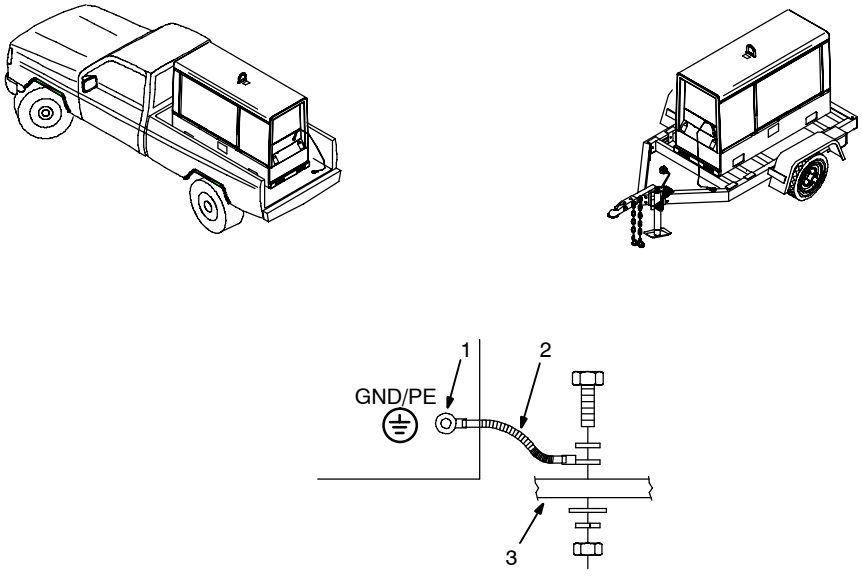
11-2. Grounding Generator To Truck Or Trailer Frame



⚠ **Always ground generator frame to vehicle frame to prevent electric shock and static electricity hazards.**

⚠ **Also see AWS Safety & Health Fact Sheet No. 29, Grounding of Portable And Vehicle Mounted Welding Generators.**

1 Equipment Grounding Terminal (On Front Panel)

2 Grounding Cable (Not Supplied)

3 Metal Vehicle Frame

Connect cable from equipment ground terminal to metal vehicle frame. Use #8 AWG or larger insulated copper wire.

☞ *Electrically bond generator frame to vehicle frame by metal-to-metal contact.*

⚠ **Bed liners, shipping skids, and some running gear insulate the welding generator from the vehicle frame. Always connect a ground wire from the generator equipment grounding terminal to bare metal on the vehicle frame as shown.**

⚠ **If unit does not have GFCI receptacles, use GFCI-protected extension cord.**

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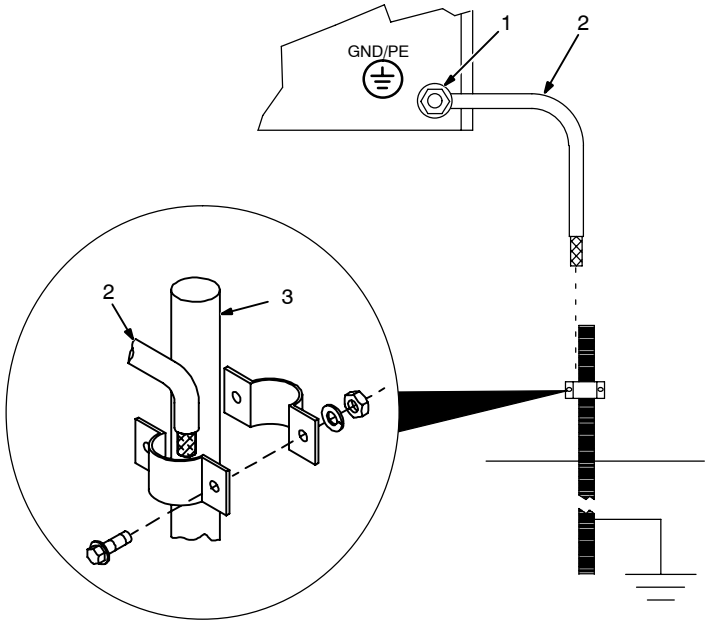
11-3. Grounding When Supplying Building Systems



1 Equipment Grounding Terminal

2 Grounding Cable

Use #8 AWG or larger insulated copper wire.

3 Ground Device

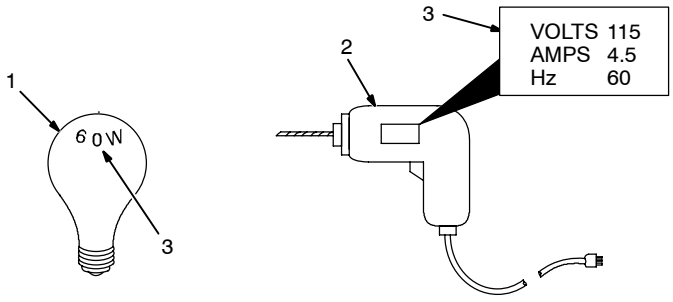
☞ *Use ground device as stated in electrical codes.*

Ground generator to system earth ground if supplying power to a premises (home, shop, farm) wiring system.

Also see AWS Safety & Health Fact Sheet No. 29, Grounding of Portable And Vehicle Mounted Welding Generators.

ST-800 576-B

11-4. How Much Power Does Equipment Require?



1 Resistive Load

A light bulb is a resistive load and requires a constant amount of power.

2 Non-Resistive Load

Equipment with a motor is a non-resistive load and requires approximately six times more power while starting the motor than when running (see Section 11-8).

3 Rating Data

Rating shows volts and amperes, or watts required to run equipment.

Amperes x Volts = Watts

Example 1: If a drill uses 4.5 amperes at 115 volts, calculate its running power requirement in watts.

4.5 A x 115 V = 520 W

The load applied by the drill is 520 watts.

Example 2: If three 200 watt flood lamps are used with the drill from Example 1, add the individual loads to calculate total load.

(3 x 200W) + 520 W = 1120 W

The total load applied by the three flood lamps and drill is 1120 watts.

S-0623

11-5. Approximate Power Requirements For Industrial Motors

Industrial Motors	Rating	Starting Watts	Running Watts
Split Phase	1/8 HP	800	300
	1/6 HP	1225	500
	1/4 HP	1600	600
	1/3 HP	2100	700
	1/2 HP	3175	875
Capacitor Start-Induction Run	1/3 HP	2020	720
	1/2 HP	3075	975
	3/4 HP	4500	1400
	1 HP	6100	1600
	1-1/2 HP	8200	2200
	2 HP	10550	2850
	3 HP	15900	3900
	5 HP	23300	6800
Capacitor Start-Capacitor Run	1-1/2 HP	8100	2000
	5 HP	23300	6000
	7-1/2 HP	35000	8000
	10 HP	46700	10700
Fan Duty	1/8 HP	1000	400
	1/6 HP	1400	550
	1/4 HP	1850	650
	1/3 HP	2400	800
	1/2 HP	3500	1100

11-6. Approximate Power Requirements For Farm/Home Equipment

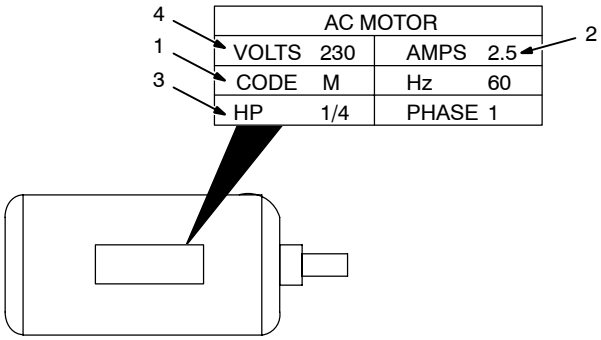
Farm/Home Equipment	Rating	Starting Watts	Running Watts
Stock Tank De-Icer		1000	1000
Grain Cleaner	1/4 HP	1650	650
Portable Conveyor	1/2 HP	3400	1000
Grain Elevator	3/4 HP	4400	1400
Milk Cooler		2900	1100
Milker (Vacuum Pump)	2 HP	10500	2800
FARM DUTY MOTORS	1/3 HP	1720	720
Std. (e.g. Conveyors,	1/2 HP	2575	975
Feed Augers, Air	3/4 HP	4500	1400
Compressors)	1 HP	6100	1600
	1-1/2 HP	8200	2200
	2 HP	10550	2850
	3 HP	15900	3900
	5 HP	23300	6800
High Torque (e.g. Barn	1-1/2 HP	8100	2000
Cleaners, Silo Unloaders,	5 HP	23300	6000
Silo Hoists, Bunk Feeders)	7-1/2 HP	35000	8000
	10 HP	46700	10700
3-1/2 cu. ft. Mixer	1/2 HP	3300	1000
High Pressure 1.8 Gal/Min	500 PSI	3150	950
Washer 2 gal/min	550 PSI	4500	1400
2 gal/min	700 PSI	6100	1600
Refrigerator or Freezer		3100	800
Shallow Well Pump	1/3 HP	2150	750
	1/2 HP	3100	1000
Sump Pump	1/3 HP	2100	800
	1/2 HP	3200	1050

11-7. Approximate Power Requirements For Contractor Equipment

Contractor	Rating	Starting Watts	Running Watts
Hand Drill	1/4 in	350	350
	3/8 in	400	400
	1/2 in	600	600
Circular Saw	6-1/2 in	500	500
	7-1/4 in	900	900
	8-1/4 in	1400	1400
Table Saw	9 in	4500	1500
	10 in	6300	1800
Band Saw	14 in	2500	1100
Bench Grinder	6 in	1720	720
	8 in	3900	1400
	10 in	5200	1600
Air Compressor	1/2 HP	3000	1000
	1 HP	6000	1500
	1-1/2 HP	8200	2200
	2 HP	10500	2800
Electric Chain Saw	1-1/2 HP, 12 in	1100	1100
	2 HP, 14 in	1100	1100
Electric Trimmer	Standard 9 in	350	350
	Heavy Duty 12 in	500	500
Electric Cultivator	1/3 HP	2100	700
Elec. Hedge Trimmer	18 in	400	400
Flood Lights	HID	125	100
	Metal Halide	313	250
	Mercury	1000	
	Sodium	1400	
	Vapor	1250	1000
Submersible Pump	400 gph	600	200
Centrifugal Pump	900 gph	900	500
Floor Polisher	3/4 HP, 16 in	4500	1400
	1 HP, 20 in	6100	1600
High Pressure Washer	1/2 HP	3150	950
	3/4 HP	4500	1400
	1 HP	6100	1600
55 gal Drum Mixer	1/4 HP	1900	700
Wet & Dry Vac	1.7 HP	900	900
	2-1/2 HP	1300	1300

11-8. Power Required To Start Motor

Single-Phase Induction Motor Starting Requirements								
Motor Start Code	G	H	J	K	L	M	N	P
KVA/HP	6.3	7.1	8.0	9.0	10.0	11.2	12.5	14.0



1 Motor Start Code

2 Running Amperage

3 Motor HP

4 Motor Voltage

To find starting amperage:

Step 1: Find code and use table to find kVA/HP. If code is not listed, multiply running amperage by six to find starting amperage.

Step 2: Find Motor HP and Volts.

Step 3: Determine starting amperage (see example).

Welding generator amperage output must be at least twice the motor's running amperage.

(kVA/HP x HP x 1000) / Volts = Starting Amperage

Example: Calculate starting amperage required for a 230 V, 1/4 HP motor with a motor start code of M.

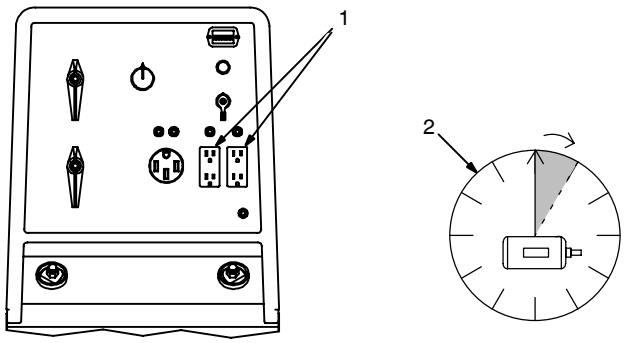
Volts = 230, HP = 1/4, kVA/HP = 11.2

(11.2 x 1/4 x 1000) / 230 = 12.2A

Starting the motor requires 12.2 amperes.

S-0624

11-9. How Much Power Can Generator Supply?



1 Limit Load To 90% Of Generator Output

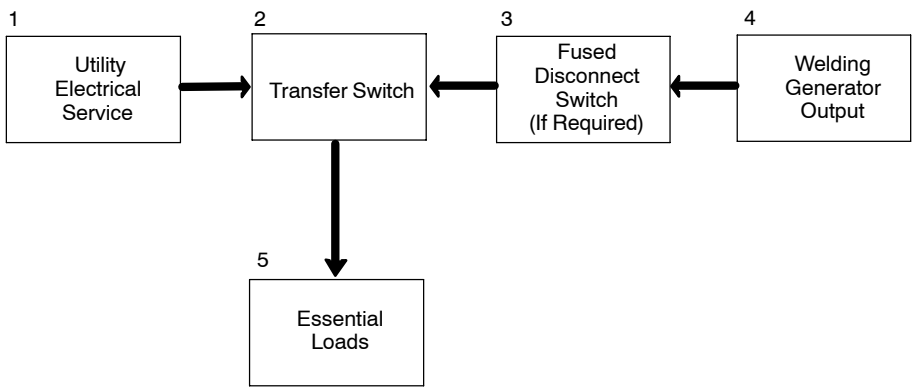
Always start non-resistive (motor) loads in order from largest to smallest, and add resistive loads last.

2 5 Second Rule

If motor does not start within 5 seconds, turn off power to prevent motor damage. Motor requires more power than generator can supply.

Ref. ST-800 396-A / S-0625

11-10. Typical Connections To Supply Standby Power



⚠ **Have only qualified persons perform these connections according to all applicable codes and safety practices.**

⚠ **Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.**

☞ *Customer-supplied equipment is required if generator will supply standby power during emergencies or power outages.*

1 Utility Electrical Service

2 Transfer Switch (Double-Throw)

Switch transfers the electrical load from electric utility service to the generator. Transfer load back to electric utility when service is restored.

Install correct switch (customer-supplied). Switch rating must be same as or greater than the branch overcurrent protection.

3 Fused Disconnect Switch

Install correct switch (customer-supplied) if required by electrical code.

4 Welding Generator Output

Generator output voltage and wiring must be consistent with regular (utility) system voltage and wiring.

Connect generator with temporary or permanent wiring suitable for the installation.

Turn off or unplug all equipment connected to generator before starting or stopping engine. When starting or stopping, the engine has low speed which causes low voltage and frequency.

5 Essential Loads

Generator output may not meet the electrical requirements of the premises. If generator does not produce enough output to meet all requirements, connect only essential loads (pumps, freezers, heaters, etc. – See Section 11-4).

11-11. Selecting Extension Cord (Use Shortest Cord Possible)

Cord Lengths for 120 Volt Loads

If unit does not have GFCI receptacles, use GFCI-protected extension cord.

Current (Amperes)	Load (Watts)	Maximum Allowable Cord Length in ft (m) for Conductor Size (AWG)*					
		4	6	8	10	12	14
5	600			350 (106)	225 (68)	137 (42)	100 (30)
7	840		400 (122)	250 (76)	150 (46)	100 (30)	62 (19)
10	1200	400 (122)	275 (84)	175 (53)	112 (34)	62 (19)	50 (15)
15	1800	300 (91)	175 (53)	112 (34)	75 (23)	37 (11)	30 (9)
20	2400	225 (68)	137 (42)	87 (26)	50 (15)	30 (9)	
25	3000	175 (53)	112 (34)	62 (19)	37 (11)		
30	3600	150 (46)	87 (26)	50 (15)	37 (11)		
35	4200	125 (38)	75 (23)	50 (15)			
40	4800	112 (34)	62 (19)	37 (11)			
45	5400	100 (30)	62 (19)				
50	6000	87 (26)	50 (15)				

*Conductor size is based on maximum 2% voltage drop

Cord Lengths for 240 Volt Loads

If unit does not have GFCI receptacles, use GFCI-protected extension cord.

Current (Amperes)	Load (Watts)	Maximum Allowable Cord Length in ft (m) for Conductor Size (AWG)*					
		4	6	8	10	12	14
5	1200			700 (213)	450 (137)	225 (84)	200 (61)
7	1680		800 (244)	500 (152)	300 (91)	200 (61)	125 (38)
10	2400	800 (244)	550 (168)	350 (107)	225 (69)	125 (38)	100 (31)
15	3600	600 (183)	350 (107)	225 (69)	150 (46)	75 (23)	60 (18)
20	4800	450 (137)	275 (84)	175 (53)	100 (31)	60 (18)	
25	6000	350 (107)	225 (69)	125 (38)	75 (23)		
30	7000	300 (91)	175 (53)	100 (31)	75 (23)		
35	8400	250 (76)	150 (46)	100 (31)			
40	9600	225 (69)	125 (38)	75 (23)			
45	10,800	200 (61)	125 (38)				
50	12,000	175 (53)	100 (31)				

*Conductor size is based on maximum 2% voltage drop

☞ *Hardware is common and not available unless listed.*

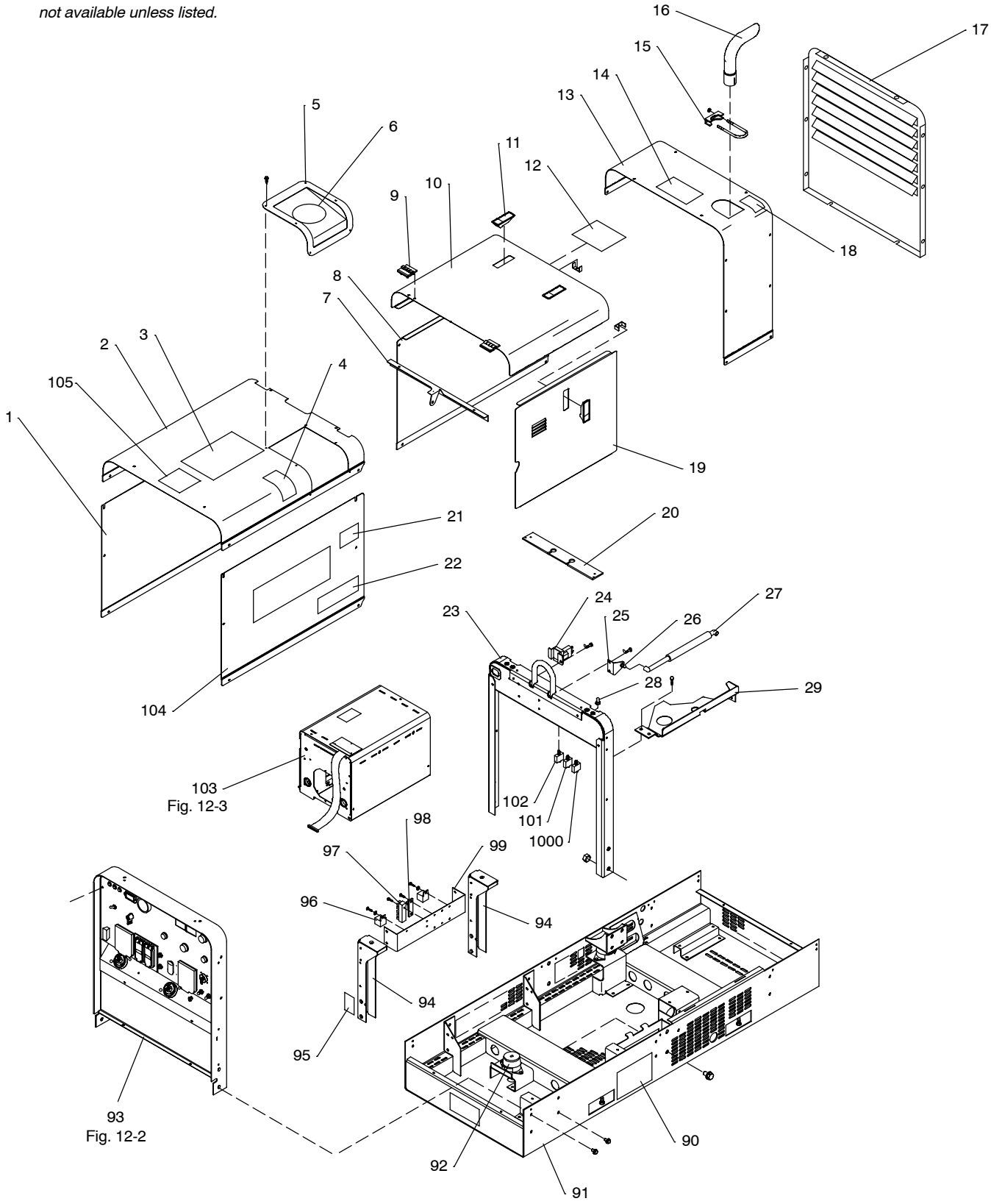
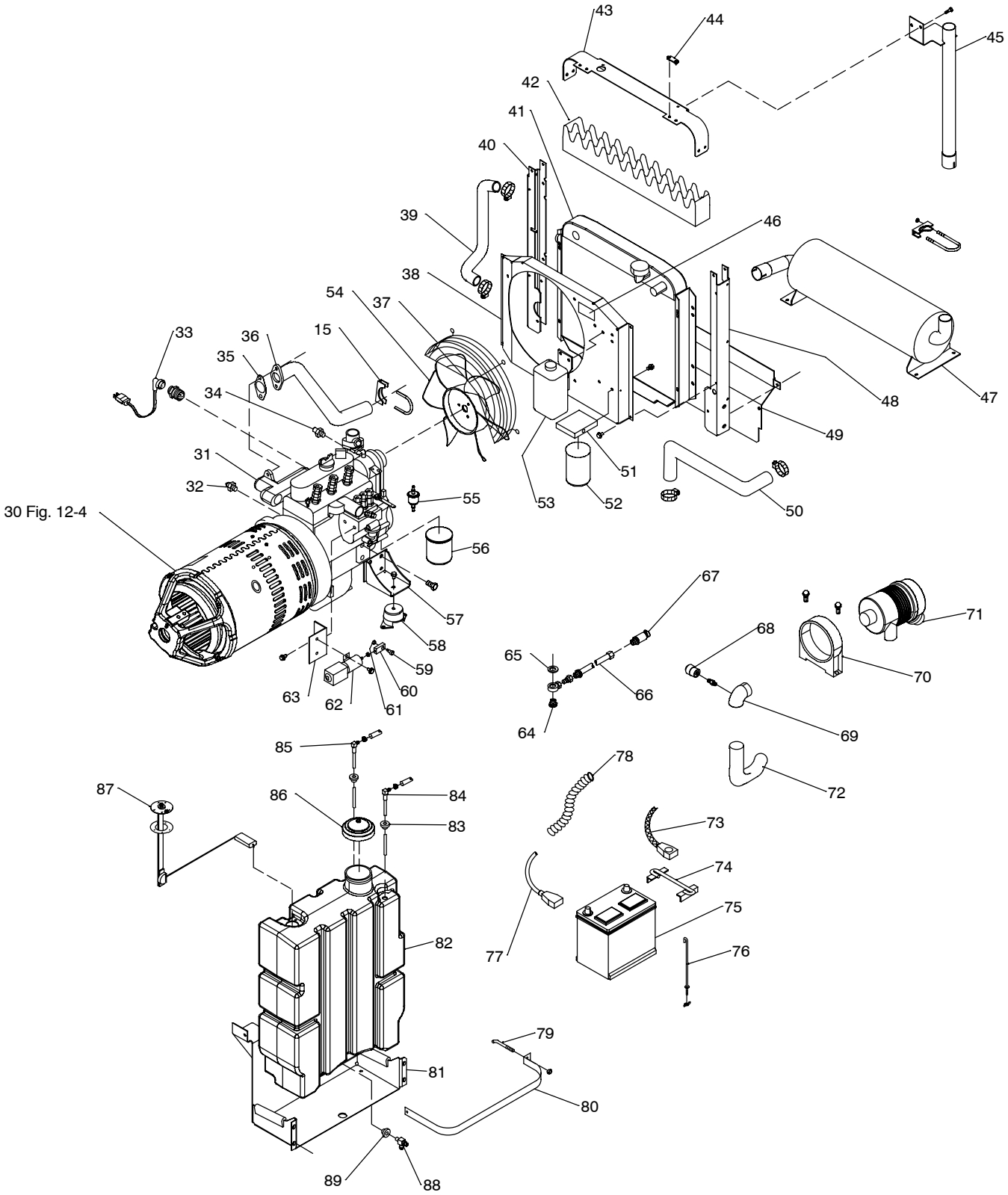


Figure 12-1. Main Assembly


30 Fig. 12-4
802 324-N

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

Figure 12-1. Main Assembly

1		+198 157	PANEL, generator left	1
1		♦+198 873	PANEL, generator left stainless	1
2		+198 155	COVER, generator	1
2		+♦198 871	COVER, generator stainless	1
		♦163 163	SCREW, 250−20x .50 Hex Hd−pln Stainless Pln T18−8 302−305	37
		♦163 175	SCREW, 250−20x .75 Hex Hd−pln Stainless Pln T18−8 302−305	As Rqd.
		♦163 167	WASHER, Lock .254idx0.489odx.062t Stainless Split.250	37
		♦163 174	WASHER, Flat .281idx0.625odx.050t Stainless	37
3		233 953	LABEL, warning general precautionary CSA	1
4		107 990	LABEL, use diesel fuel only	1
		222 513	LABEL, warning falling equipment	1
5		198 159	TRAY, fuel spill	1
6		200 366	EDGE TRIM, style 70−p−11 nitrile rubber x roll	2 ft
7		193 411	BRACE, hood access rear	1
8		198 156	DOOR, access	1
8		♦198 872	DOOR, access stainless	1
9		198 525	HINGE, door access 180deg	2
10		+198 164	HOOD, access	1
10		+♦198 878	HOOD, access stainless	1
11		194 320	LATCH, door access	3
12		237 919	LABEL, engine maintenance	1
13		198 162	PLENUM, radiator cover	1
13		♦198 875	PLENUM, radiator cover stainless	1
14		200 448	LABEL, warning steam and hot coolant	2
15		109 591	CLAMP, muffler 1.750dia	3
16		201 882	PIPE, exhaust elbow 1.654 ID stainless	1
17		198 153	PANEL, rear	1
18		176 230	LABEL, hot exhaust	1
19		198 154	DOOR, access removable	1
19		♦198 870	DOOR, access removable stainless	1
20		209 344	SEAL, lifting eye	1
21		090 281	LABEL, caution do not use ether	1
22		168 385	LABEL, warning battery explosion can blind	1
23		198 054	UPRIGHT, base center	1
24	CR2	155 309	CONTACTOR, solenoid 12VDC continuous 400 A	1
25		193 414	BRACKET, mtg gas spring front	1
26		172 296	BALL GAS SPRING, stud .39dia	2
27		192 239	SPRING, pressure gas	1
28		206 795	BOOT, circuit breaker clear hex nut	3
29		197 265	BRACKET, mtg air cleaner and stop door access	1
30		Figure 12-4	GENERATOR ASSEMBLY	1
31		236 993	ENGINE, Kubota dsl elec d1005−e3b−mlr−1 (consisting of)	1
32	S2	*197 145	. SWITCH, oil pressure 7 psi no screw terminal (included w/engine)	1
		114 923	BOOT, insulator term post red (for starter and alternator terminals)	2
33		200 653	HEATER, block engine 120v 400w kabota 905	1
34	S3	205 800	SWITCH, thermo temp 230deg ±5deg F NO	1
35		192 517	GASKET, exhaust manifold	1
36		192 194	PIPE, exhaust flexible inlet	1
37		191 693	GUARD, fan	1
38		+202 243	SHROUD, fan	1
39		191 341	HOSE, radiator outlet	1
40		198 186	BRACKET, mtg radiator LH	1
41		197 822	RADIATOR, w/14# cap 3 row core 1.125 inlet/outlet	1
42		194 578	BAFFLE, air foam	1
43		198 181	RADIATOR ARCH	1
44		191 626	BUMPER, door access	2
45		192 195	PIPE, exhaust outlet	1
46		182 092	LABEL, warning moving parts	2
47		201 528	MUFFLER, exhaust	1
48		198 187	BRACKET, mtg radiator RH	1
49		198 185	BAFFLE, lower radiator	1

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

Figure 12-1. Main Assembly (Continued)

.. 50		191 342	.. HOSE, radiator inlet	1
.. 51		202 198	.. BASE, fuel filter	1
.. 52		*192 744	.. FILTER, fuel spin-on	1
.. 53		187 462	.. BOTTLE, overflow w/cap and hose	1
		208 124	..... CAP, w/gasket overflow bottle	1
		192 934	.. BRACKET, mtg coolant recovery tank	1
.. 54		242 596	.. FAN, engine 330mm pusher kubota	1
.. 55		*066 113	.. FILTER, fuel inline .250	1
.. 56		*196 428	.. FILTER, oil	1
.. 57		192 475	.. SUPPORT, engine	2
.. 58		192 476	.. MOUNT, engine vibration	2
.. 59		118 829	.. SCREW, shld stl sch .312-18 x .500 x .375	1
.. 60		194 127	.. LINKAGE, throttle solenoid	1
.. 61		145 675	.. NUT, .312-18 x .50 hex .37h stl pld deformed	1
.. 62		192 196	.. SOLENOID, 12VDC 46A push/hold (throttle)	1
.. 63		192 663	.. BRACKET, mtg solenoid	1
.. 64		047 234	.. BOLT, banjo	1
.. 65		047 235	.. WASHER, seal oil copper .879 ID x 1.059 OD	1
.. 66		203 897	.. HOSE, oil w/fittings 22.500 lg	1
.. 67		165 271	.. VALVE, oil drain 3/8-18 NPTF	1
.. 68		209 329	.. INDICATOR, restriction air	1
.. 69		197 256	.. HOSE, elbow air cleaner	1
.. 70		193 026	.. BAND, mtg air cleaner case	1
.. 71		192 188	.. AIR CLEANER, intake 90deg outlet 4.25 in dia	1
		*187 441	.. ELEMENT, air cleaner	1
		♦202 102	.. ELEMENT, air cleaner safety	1
.. 72		197 227	.. HOSE, elbow air intake	1
.. 73		032 453	.. CABLE, bat neg 24.375 No. 2 awg w/clamp and .375 rng	1
.. 74		204 875	.. HOLD DOWN, battery	1
.. 75		146 237	.. BATTERY, stor 12V 535crk 90rsv gp 55	1
.. 76		494 604	.. BOLT, j stl .250–20 x 8.000 pld w/nuts&washers	2
.. 77		182 276	.. CABLE, bat pos 28.000 No. 1 awg w/clamp and .406 lug	1
.. 78		110 465	.. TUBING, corrugated plastic slit .500 dia xcoil	2.1 ft
		108 081	.. TERMINAL PROTECTOR, battery post mtg	2
.. 79		097 829	.. BOLT, J Stl .250–20 X 2.750 Pld	1
.. 80		200 407	.. STRAP, Fuel Tank	1
.. 81		198 168	.. SUPPORT, Fuel Tank/Weld Components	1
.. 82		198 180	.. TANK, Fuel 13.1 Gal (Consisting Of)	1
.. 83		124 253	.... BUSHING, Tank Fuel	2
.. 84		198 510	.... FTG, Stand Pipe Hose .3125 X24.570lg 90 Deg Zinc	1
.. 85		198 511	.... FTG, Stand Pipe Hose .1875x24.570lg 90 Deg Zinc	1
.. 86		190 198	.... CAP, Tank Screw–on 3.500 In W/Vent	1
.. 87		198 512	.... SENDER, Fuel Gauge 22.500 Deep Tank	1
.. 88		189 908	.... VALVE, Drain Fuel 180 Deg Zinc Pld	1
.. 89		181 572	.... BUSHING, Tank Fuel	1
.. 90		197 930	.. LABEL, warning do not weld on base	2
.. 91		197 835	.. BASE	1
.. 92		192 477	.. MOUNT, engine vibration	1
.. 93		Figure 12-2	.. FRONT PANEL ASSEMBLY	1
.. 94		198 167	.. SUPPORT, inverter chassis	2
.. 95		190 861	.. LABEL, electric shock and moving parts	1

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

Figure 12-1. Main Assembly (Continued)

.....		213 226	.. HARNESS, wiring ignition (consisting of)	1
.. 96	CR1, CR2	173 069	.... RELAY, encl 12VDC SPDT 30A/20A 5 pin flange mtg	2
.. 97	.....	197 147	.... BLOCK, term 5-4-3	1
.. 98	... D3	135 184	.... DIODE BOARD	1
.. 99	.....	191 735	.... STRIP, mtg components	1
.....		148 850	.... SOCKET, relay 5 pin	2
.....	PLG26 ...	135 275	.... CONNECTOR, rect univ 084 15P/S 3 row plug (service kit)	1
.....	PLG5	166 680	.... CONNECTOR, rect univ 084 12P/S 3 row plug (service kit)	1
.....	PLG8	177 859	.... CONNECTOR, body 5 terminal	1
.....	PLG34 ...	153 501	.... CONNECTOR, rect univ 039 6P/S 3 row plug (service kit)	2
.....	S6	021 467	.... SWITCH, tgl spst 3a 250v off–none–(on) spd term	1
.....		187 654	.... SEAL, wire univ 12p/s 3row	1
.....		187 655	.... SEAL, wire univ 15p/s 3row	1
.....		208 871	.. HARNESS, wiring engine compartment (consisting of)	1
.....	RC5	158 466	.... CONNECTOR, rect univ 084 12P/S 3 row rcpt	1
.....	PLG38 ...	192 170	.... CONNECTOR, rect 250 2skt 1 row plug	1
.....		192 169	.... CONNECTOR, rect 250 1skt 1 row plug	1
.....	PLG36 ...	192 171	.... CONNECTOR, rect 250 3skt 1 row plug	1
.....	PLG37 ...	192 168	.... CONNECTOR, rect 250 1 pin 1 row rcpt	1
.....	PLG39 ...	092 670	.... CONNECTOR, rect univ 084 3P/S 1 row plug	1
.....		192 167	.... SEAL, wire univ 3P/S 1 row	1
. 100	.. CB7	147 658	.... CIRCUIT BREAKER, man rest 1P 30A 250VAC screw (see Figure 12-1)	1
. 101	.. CB8	115 427	.... CIRCUIT BREAKER, man reset 1P 25A 250VAC frict (see Figure 12-1)	1
. 102	.. CB10	139 266	.... SUPPLEMENTARY PROTECTOR, man reset 1P 15A 250VAC (see Figure 12-1)	1
.....		187 654	.... SEAL, wire univ 12p/s 3row	1
.....		148 850	.... SOCKET, relay 5 pin (for CR3)	1
. 103	.....	Figure 12-3	.. INVERTER ASSEMBLY	1
. 104	.....	198 158	.. PANEL, generator right	1
. 104	.....	♦198 874	.. PANEL, generator right stainless	1
. 105	.....	233 088	.. Label, Danger Using A Generator Indoors Can Kill You In Minutes	1
.....		194 126	.. KIT, foam	1

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

*Recommended Spare Parts.

♦ Optional

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

☞ *Hardware is common and not available unless listed.*

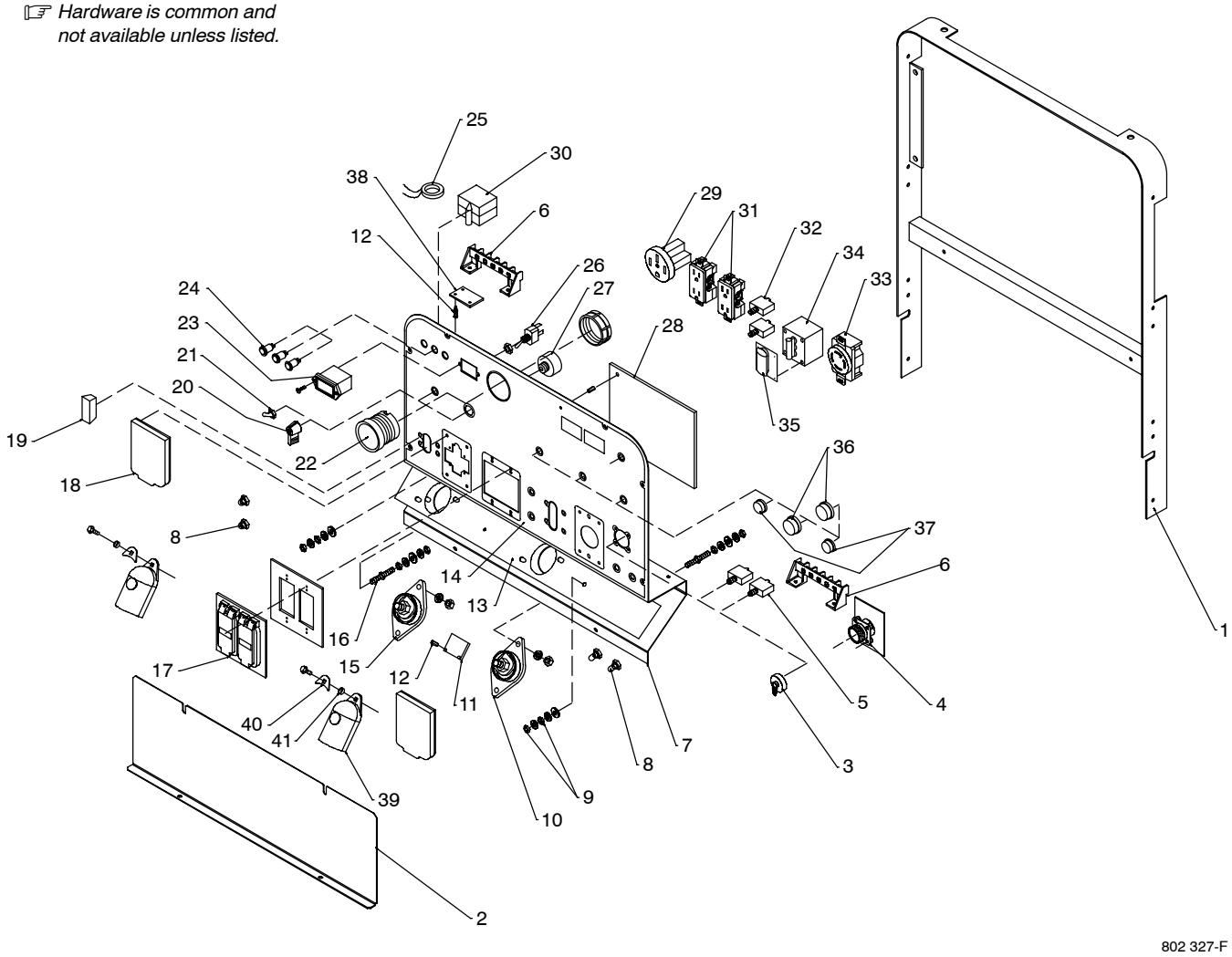


Figure 12-2. Front Panel

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
			Figure 12-2. Front Panel (Figure 12-1, Item 93)	
1		198 049	UPRIGHT, base front	1
2		+191 737	PANEL, front louver	1
3		170 391	CONN, circ ms protective cap	1
4	RC14, PC6	224 951	CIRCUIT CARD ASSY, connector/receptacle	1
	PLG13	115 091	CONNECTOR, rect mini 045 10skt 2 row plug (service kit)	1
5	CB5,CB6	083 432	SUPPLEMENTARY PRO, man reset 1P 10A 250VAC frict	2
6	2T, 3T	172 661	BLOCK, stud connection 6 position	2
7		212 480	PANEL, front	1
8		206 795	BOOT, circuit breaker clear hex nut	4
9		601 836	NUT, 250-20 .50hex .19H brs	8
10		241 433	TERMINAL, pwr output black	1
11	PC10	148 608	CIRCUIT CARD ASSEMBLY, filter HF	1
12		134 201	STAND−OFF SUPPORT, pc card .312/.375w/post&lock .43	6
13			PLATE, lower (order by model & serial number)	1
14			NAMEPLATE, upper (order by model & serial number)	1
15		241 432	TERMINAL, pwr output red	1
16		083 030	STUD, brs .250-20 x 1.750 w/hex collar	2
17		213 456	COVER, receptacle duplex dual gfci weather proof	1
18		209 056	COVER, receptacle w/ gasket	2
19		203 016	BOOT, circuit breaker 2 pole	1
20		119 014	LEVER, switch black	1
21		021 385	BOOT, tgl switch lever	1

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

Figure 12-2. Front Panel (Continued)

22		192 265	GAUGE, fuel elec switch w/o switchgage sensor	1
23		145 247	METER, hour 12−24vdc 1.25 x 2.12 rect	1
24	PL1, PL2, PL3	206 879	LIGHT, ind amber lens 12v snap−in mtg .500 mtg hol	1
25	CT2	192 237	TRANSFORMER, current	1
26	S6	021 467	SWITCH, tgl spst 3a 250v off−none−(on) spd term	1
27	S1	176 606	SWITCH, ignition 4posn w/o handle	1
28	PC3	225 974	CIRCUIT CARD ASSEMBLY, front panel	1
		210 844	SHIELD, pcb protective anti static 6.338x11.000	1
29	RC1	182 954	RECEPTACLE, str 3p4w 50a 125/250V (single-phase)	1
		♦119 172	PLUG, str grd 3p4w 50a 125/250v *14−50p (for RC1)	1
30	CB1	217 858	SUPPLEMENTARY PROTECTOR, man reset 2P 50A 240VAC	1
31	RC2, RC3	214 918	RECEPTACLE, str dx grd 2p3w 20a 125v *5−20r	2
	GFCI-1, 2	♦151 981	RECEPTACLE, Str Dx Grd 2p3w 15/20a 125v *5−20r Gfi	2
32	CB2,CB3	093 996	SUPPLEMENTARY PRO, man reset 1P 20A 250VAC frict	2
33	RC4	007 469	RECEPTACLE, twlk grd 3P4W 30A 250V (3-phase)	1
		♦007 470	PLUG, tw lk grd 3p4w 30a 250v *l15−30p (For RC4)	1
34	CB4	192 565	SUPPLEMENTARY PROTECTOR, man reset 3P 30A 250VAC	1
35		203 017	BOOT, circuit breaker 3 pole	1
36		174 991	KNOB, pointer 1.250dia x .250 ID w/spring clip	2
37		174 992	KNOB, pointer .820dia x .250 ID w/spring clip	2
38	PC9	181 261	CIRCUIT CARD ASSY, filter hf	1
39		186 621	BOOT, generic output stud	2
40		181 169	SPACER, output stud	2
41		180 735	WASHER, output stud	2

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

*Recommended Spare Parts.

♦ Optional

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

☞ *Hardware is common and not available unless listed.*

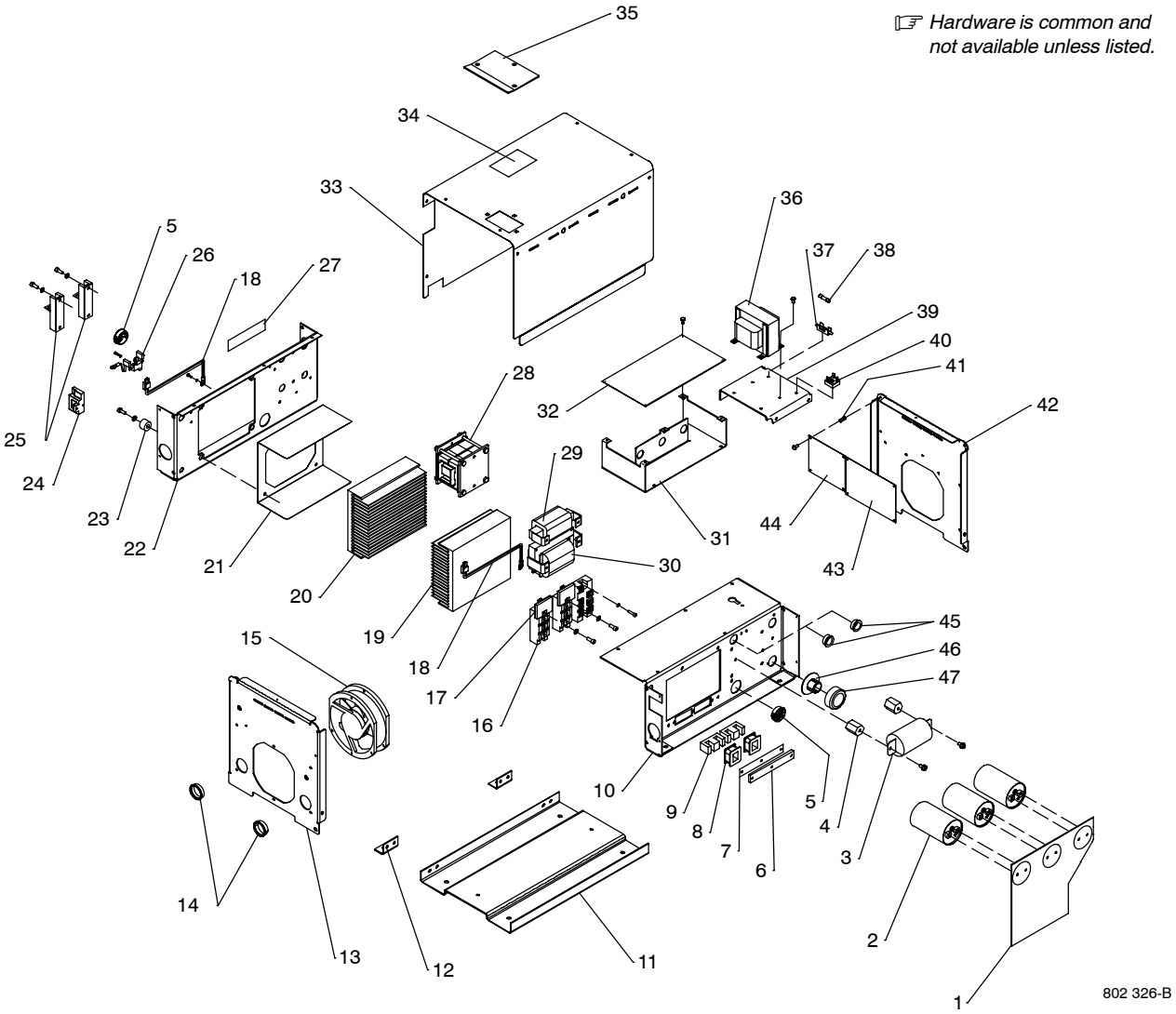


Figure 12-3. Inverter Assembly

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

Figure 12-3. Inverter Assembly (Figure 12-1, Item 103)

1	PC2	196 148	CIRCUIT CARD ASSEMBLY, interconnecting	1
2	C3,C4,C5	192 935	CAPACITOR, elctlt 2700uf 450	3
3	C1	186 015	CAPACITOR, polyp film .34uf	1
4		025 248	STAND-OFF, insul .250-20 x 1.2	2
5		179 276	BUSHING, snap-in nyl 1.000	1
6		175 140	BRACKET, DI/DT	1
7		181 197	GASKET, DI/DT rubber	1
8	L3,L4	175 482	COIL, DI/DT	2
9		109 056	CORE, ferrite E 2.164 lg x 1.09	2
10		185 731	WINDTUNNEL, RH	1
11		189 755	BASE	1
12		191 568	FOOT, mtg unit	2
13		200 649	PANEL, front	1
14		170 647	BUSHING, snap-in 1.312 ID	2
15		175 084	MOTOR, fan 24VDC 3000RPM	1
16	SR1	179 629	KIT, diode power module	1
17	PM1,PM2	180 110	KIT, transistor IGBT module	2
18	RT1,RT2	173 632	THERMISTOR, NTC 30K ohm at 25D C	2
19		173 631	HEAT SINK, power module	1
20		175 192	HEAT SINK, rect	1
21		175 255	INSULATOR, rectifier	1
22		+183 551	WINDTUNNEL, LH	1

Item No.	Dia. Mkgs.	Part No.	Description	Quantity

Figure 12-3. Inverter Assembly (Continued)

.. 23	.....	181 853	.. INSULATOR, screw	4
.. 24	.. HD1	.... 189 567	.. TRANSDUCER, current 400A	1
.. 25	. D1,D2	... 179 630	.. KIT, diode ultra-fast recovery	2
.. 26	R1,C6,C7	.. 175 194	.. RESISTOR/CAPACITOR	1
.. 27	.....	185 835	.. LABEL, warning electric shock	2
.. 28	... T1	..... 173 811	.. TRANSFORMER, HF 230/460	1
.. 29	... L1	..... 173 563	.. INDUCTOR, input	1
.. 30	... Z1	..... 189 525	.. STABILIZER, output	1
.. 31	.....	189 420	.. BRACKET, mtg capacitor/PC board	1
.. 32	.. PC1	.... 212 691	.. CIRCUIT CARD ASSEMBLY, control	1
.. 33	.....	+213 412	.. WRAPPER, inverter chassis	1
.. 34	.....	190 861	.. LABEL, electric shock and moving parts	1
.. 35	.....	200 590	.. COVER, ribbon access	1
.. 36	... T2	..... 189 481	.. TRANSFORMER, control 300VA 230VAC pri	1
.. 37	.....	172 731	.. HOLDER, fuse mintr .250 x 1.250 clip anti−pivot	1
.. 38	... F1	..... 169 296	.. FUSE, mintr gl 25. amp 125 volt	1
.. 39	.....	189 422	.. BRACKET, mtg transformer control	1
.. 40	.. SR2	.... 035 704	.. RECTIFIER, integ bridge 40. amp 800v	1
.. 41	.....	115 440	.. STAND-OFF, No. 6-32 x .687 lg	8
.. 42	.....	200 651	.. PANEL, rear	1
.. 43	.. PC8	.... 213 231	.. CIRCUIT CARD ASSEMBLY, voltage regulator	1
.. 44	.. PC7	.... 203 130	.. CIRCUIT CARD ASSY, gen power (includes)	1
.....	F1	 027660	.... FUSE, Mintr Cer 20. Amp 250 Volt	1
.. 45	.....	153 403	.. BUSHING, snap-in nyl .750 ID	2
.. 46	.....	177 547	.. BUSHING, snap-in nyl ct-mount	1
.. 47	.. CT1	.... 175 199	.. TRANSFORMER, current	1
.....		213 410	.. HARNESS, wiring unit (consisting of)	1
.....	RC26	.... 147 663	.... CONNECTOR, rect univ 084 15 p/s 3 row rectp lkg (service kit)	1
.....	RC25	.... 116 045	.... CONNECTOR, rect univ 084 6p/s 3 row rcpt lkg (service kit)	1
...	PLG24, PLG44	115 094	.... CONNECTOR, rect mini 045 4skt 2 row plug (service kit)	1
....	RC10, PLG31	168 071	.... CONNECTOR, rect univ 084 9P/S 3 row rcpt (service kit)	1
.....	PLG2	.... 115 091	.... CONNECTOR, rect mini 045 10skt 2 row plug (service kit)	1
.....	PLG23	... 130 203	.... CONNECTOR, rect mini 045 12 skt 2 row plug (service kit)	1
.....	RC24	.... 047 483	.... CONNECTOR, rect univ 084 15P/S 3 row rcpt (service kit)	1
.....	PLG50	... 136 810	.... CONNECTOR, rect univ 084 4p/s 1 row plug cable lkg (service kit)	1
.....	PLG43	... 115 093	.... CONNECTOR, rect mini 045 6skit 2row plg cable lkg (service kit)	1
.....	PLG21	... 115 092	.... CONNECTOR, rect mini 045 8skt 2row plug cable lkg (service kit)	1
.....	PLG22	... 131 204	.... CONNECTOR, rect mini 045 3skt 1row plug cable lkg (service kit)	1
.....	PLG9	.... 183 046	.... CABLE, LEM	1
.....	F2	..... 012 663	.... FUSE, mintr gl slo−blo 3. amp 250 volt	1

+When ordering a component originally displaying a precautionary label, the label should also be ordered.
*Recommended Spare Parts.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

☞ *Hardware is common and not available unless listed.*

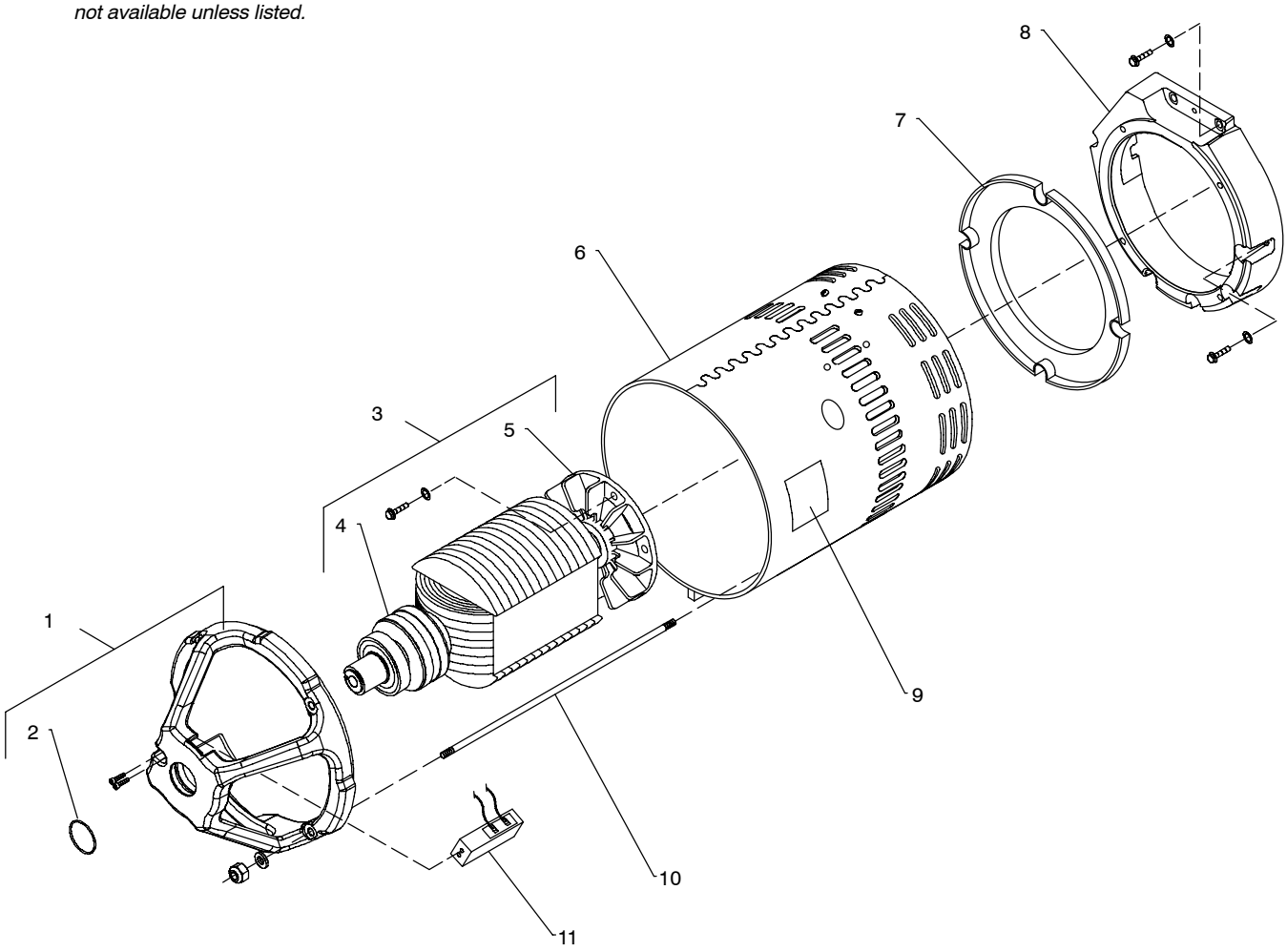


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Figure 12-4. Generator

Item No.	Dia. Mkgs.	Part No.	Description	Quantity
Figure 12-4. Generator Assembly (Figure 12-1, Item 30)				
.. 1		228 244	.. ENDBELL (includes)	1
.. 2		183 419	.... O−RING	1
.. 3		213 388	.. ROTOR, generator (consisting of)	1
.. 4		181 143	.... BEARING, ball rdl sgl row .984 x 2.047 x .591	1
.. 5		192 600	.... FAN, rotor gen	1
.. 6		+212 957	.. STATOR, generator	1
.. 7		159 918	.... BAFFLE, fan	1
.. 8		193 515	.. ADAPTER, engine	1
.. 9		013 367	.. LABEL, warning moving parts	2
.. 10		170 861	.. STUD, stl .375-16 x 17.375	4
.. 11		205 725	.. BRUSHHOLDER ASSY, generator	1

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

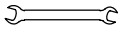
*Recommended Spare Parts.

To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.

Notes

SOCKET/WRENCH SELECTION TABLE (U.S. STANDARD)

Specifications		Socket or Wrench Size	
Bolt Diameter	Decimal Equivalent	Bolt	Nut
1/4 in	.250 in	3/8 in	7/16 in
5/16 in	.3125 in	1/2 in	9/16 in
3/8 in	.375 in	9/16 in	5/8 in
7/16 in	.4375 in	5/8 in	3/4 in
1/2 in	.500 in	3/4 in	13/16 in
9/16 in	.5625 in	7/8 in	7/8 in
5/8 in	.625 in	15/16 in	1 in
3/4 in	.750 in	1-1/8 in	1-1/8 in
7/8 in	.875 in	1-5/16 in	1-5/16 in
1 in	1.000 in	1-1/2 in	1-1/2 in



SOCKET/WRENCH SELECTION TABLE (METRIC)

Specifications		Socket or Wrench Size	
Bolt Diameter	U.S. Decimal Equivalent	Bolt	Nut
6 mm	.2362 in	10 mm	10 mm
8 mm	.3150 in	14 mm	14 mm
10 mm	.3937 in	17 mm	17 mm
12 mm	.4724 in	19 mm	19 mm
14 mm	.5512 in	22 mm	22 mm
16 mm	.6299 in	24 mm	24 mm
18 mm	.7087 in	27 mm	27 mm
22 mm	.8661 in	32 mm	32 mm
24 mm	.9449 in	36 mm	36 mm

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Within the warranty periods listed below, Miller will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Miller must be notified in writing within thirty (30) days of such defect or failure, at which time Miller will provide instructions on the warranty claim procedures to be followed.

Miller shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the delivery date of the equipment to the original end-user purchaser, and not to exceed one year after the equipment is shipped to a North American distributor or eighteen months after the equipment is shipped to an International distributor.

1. 5 Years Parts — 3 Years Labor
   * Original main power rectifiers only to include SCRs, diodes, and discrete rectifier modules
2. 3 Years — Parts and Labor
   * Engine Driven Welding Generators **(NOTE: Engines are warranted separately by the engine manufacturer.)**
   * Inverter Power Sources (Unless Otherwise Stated)
   * Plasma Arc Cutting Power Sources
   * Process Controllers
   * Semi-Automatic and Automatic Wire Feeders
   * Smith 30 Series Flowgauge and Flowmeter Regulators (No Labor)
   * Transformer/Rectifier Power Sources
   * Water Coolant Systems (Integrated)
3. 2 Years — Parts
   * Auto-Darkening Helmet Lenses (No Labor)
4. 1 Year — Parts and Labor Unless Specified
   * Automatic Motion Devices
   * CoolBelt and CoolBand Blower Unit (No Labor)
   * External Monitoring Equipment and Sensors
   * Field Options (NOTE: Field options are covered for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
   * Flowgauge and Flowmeter Regulators (No Labor)
   * RFCS Foot Controls (Except RFCS-RJ45)
   * Fume Extractors
   * HF Units
   * ICE Plasma Cutting Torches (No Labor)
   * Induction Heating Power Sources, Coolers, and Electronic Controls/Recorders
   * Load Banks
   * Motor Driven Guns (w/exception of Spoolmate Spoolguns)
   * PAPR Blower Unit (No Labor)
   * Positioners and Controllers
   * Racks
   * Running Gear/Trailers
   * Spot Welders
   * Subarc Wire Drive Assemblies
   * Water Coolant Systems (Non-Integrated)
   * Weldcraft-Branded TIG Torches (No Labor)
   * Work Stations/Weld Tables (No Labor)
5. 6 Months — Parts
   * Batteries
   * Bernard Guns (No Labor)
   * Tregaskiss Guns (No Labor)
6. 90 Days — Parts
   * Accessory (Kits)
   * Canvas Covers
   * Induction Heating Coils and Blankets, Cables, and Non-Electronic Controls
   * M-Guns
   * MIG Guns and Subarc (SAW) Guns
   * Remote Controls and RFCS-RJ45
   * Replacement Parts (No labor)
   * Roughneck Guns
   * Spoolmate Spoolguns

Miller's True Blue® Limited Warranty shall not apply to:

1. **Consumable components; such as contact tips, cutting nozzles, contactors, brushes, relays, work station table tops and welding curtains, or parts that fail due to normal wear. (Exception: brushes and relays are covered on all engine-driven products.)**
2. Items furnished by Miller, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer's warranty, if any.
3. Equipment that has been modified by any party other than Miller, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

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In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at Miller's option: (1) repair; or (2) replacement; or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer's risk and expense. Miller's option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at a Miller authorized service facility as determined by Miller. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

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Please complete and retain with your personal records.

Model Name	Serial/Style Number
Purchase Date	(Date which equipment was delivered to original customer.)
Distributor	
Address	
City	
State	Zip

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Contact a DISTRIBUTOR or SERVICE AGENCY near you.

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Miller Electric Mfg. Co.
An Illinois Tool Works Company
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